THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. SEPTEMBER 5, 1895. CHICAGO, ILL. NUMBER 36.

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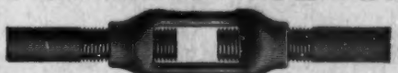

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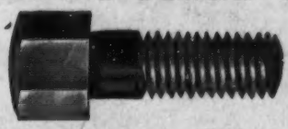

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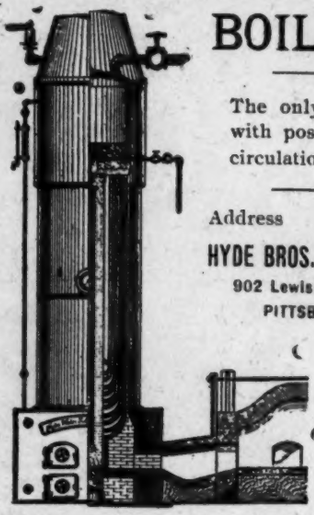

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THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. SEPTEMBER 5, 1895. CHICAGO, ILL. NUMBER 36.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

All-around advances in prices have marked the week just ending. Those on Bessemer pig and billets have made Pittsburg, the valleys and Cleveland the centers of interest that is far from cool-headed. At Pittsburg, $17 for Bessemer pig and $24 for billets have been passed and while the large buyers of the former have made it known that they are not in the market on that basis, there are plentiful predictions that considerably higher prices are yet to be seen. The fact that sales at the prices named in the past week are inconsiderable, shows that buyers are now inclined to test every step of the way; but it would appear that the wait must be a long one, if its termination is conditioned on the furnaces and mills receding from the present basis, Considerable Bessemer pig was bought at $16 and $16.25 in the valley last Thursday, and in the next two days $16.50 was done. Since that time there has been little buying, though $17 in the valley has been reported in connection with a small sale. The possible scarcity of ore, talked of in connection with the Marquette strike, has perhaps been magnified as a factor in the advance in Bessemer pig, yet the fact that as high as $3.50 has been paid for a Mesabi ore the past week would indicate that some furnacemen are anxious. The scarcity of Bessemer pig at Pittsburg has led to a reversal of the movement of months and several blocks of Bessemer, amounting to 30,000 to 40,000 tons, have been bought in Eastern Pennsylvania for shipment to Pittsburg. The advances in Southern iron announced at the end of August, came after heavy buying in which leading sellers closed 50,000 tons in four days, The new price which is 50 cents to $1 a ton higher at furnaces, added to the 50 cents advance in freight effective Sept. 15, means that Southern irons will be from $1 to $1.50 a ton higher according to grade. Northern irons have advanced, also, though not correspondingly. One Pittsburg producer of foundry grades now quotes $14.50 and $13.50 for Nos. 1 and 2 respectively; and the valley quotations on Scotch irons have gone to $15 and $14 in one instance. Soft steel in the Wheeling, Pittsburg and Cleveland districts has followed Bessemer iron. Sales have been made at $23.50 at Ohio river mill, and offers of $23 for the first quarter of 1896 have been promptly turned down in that district. In the Cleveland district there are buyers in the market, but they have not yet closed at the $24 quotations that are made. At Pittsburg, sales have been made from second hands at $23.75 and $24.00. The finished material market gives conflicting reports, indicators appearing of hesitation and waiting by some buyers, while others seem to be anticipating wants, desiring to cover before the new raw material basis becomes effective in mill products. Advances have been made in structural steel, bars, sheets and wire nails. Beams and channels are now at 1.70c Pittsburg, as minimum. The Cleveland meeting of the Merchant Bar Iron Association on Tuesday advanced bar iron to 1.40c at primary points. Plates are stronger and the Cleveland price has advanced to 2c for tank. Some mills have that figure as a Pittsburg minimum. The fact that billets have overtaken the price of rails has led to serious consideration of an advance in the latter, and we are advised that the announcement will be made in a few days.

THE CLEVELAND DISTRICT.

The beginning of stockpile loading at Marquette range mines, after seven weeks of inactivity, will assist in allaying some of the uneasiness furnacemen have felt about ore under contract from that range. An early resumption of mining will be required, however, to remove entirely the feeling that an adequate supply of Bessemer ores may not be available. Mesabi ores are being taken up to guard against a possible deficiency on other ores bought, and the question of mixture is left to be settled when the furnace is actually confronted with the necessity of a change. Quite a little tonnage of Mesabi ore has brought $3.25 lately and the past week has seen $3.50 paid on purchases aggregating 40,000 tons. This is a new record for the Mesabi product. A sale of hard Bessemer has been made in the week at $4.50, an advance of $1.20 over the opening price. Another significant transaction was the purchase of a Mesabi Bessemer for next season's delivery at $3.75. Marquette boats under contract are going to that port for ore and shipments will be well under way again by the end of the week. The Escanaba rate has advanced in the past week from 60 to 65 cents and then to 70 cents. Marquette ore uncovered by vessel contract will probably have to pay 90 cents when chartering is again renewed. The rate from the head of the laks is still $1, with boats not plentiful. The August shipment of ore through the Soo was 1,315,725 gross tons, practically all from the head of the lake. For the season to Sept. 1 the Lake Superior total is 4,896,564 tons. Adding Escanaba and Gladstone, the total movement to Sept. 1 is about 6,500,000 tons, or close to the entire output of last year.

Pig Iron. The week has been quite as exciting as the one preceding, not so much for the tonnage closed as for the rumors about prices that have persistently mingled with market facts. The probability of $16 in the valley for Bessemer iron, referred to in our last report, was quickly realized in sales; then followed $16.25 and $16.50, several thousand tons being taken at each of these prices. In the present week there has been a sale at $17.25 Pittsburg, or $16.60 valley furnace, and on one 1,000-ton lot a furnace secured $17 in the valley. The amount of business done above $16.50 in the valley is not large, though $17 can undoubtedly be done to-day by furnaces able to deliver iron this year. Rumors of higher prices are heard, $18 Pittsburg being the favorite one, but we do not find that anything has been done beyond the figures given above. Foundry iron has advanced in sympathy with Bessemer and there has been larger buying than in the past three or four weeks. Sales are reported at $13.50 in the valley for No. 2 and sellers of high silicon irons are holding for $14. For No. 1 prices named range from $14 to $15, some furnaces seeming not to have caught the spirit of the week's movement as yet. Forge iron is now held at $12.50

Continued on page 7.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Iron circles in Chicago have felt to some extent the activity and fluctuations of the markets farther East, but only in a sympathetic way. The local market has been rather quiet, no sales of any class of material of particularly large size being reported. Prices of pig iron have been advanced, and further advances are expected in the near future. It is announced that freight rates from the South will be advanced on September 16, 40 cents a ton for Chicago delivery. Southern furnaces are as a consequence unwilling to sell at the present quotations except in small lots and for immediate delivery. Several of the furnaces are out of the market entirely, and others have only a few grades on which they will quote. It is reported that the Illinois Steel Co. is in the market for several thousand tons of Southern low silicon iron. Billets and rods are in good demand, but sales last week were only small. Prices have been advanced. Orders for rails continue to be very good, and for small lots an advance over the quotations is asked. It is expected that quotations may be higher in the near future. Structural material is in large demand, in small lots. Only one contract of any size was let last week. Prices are stationary, but it is thought they will be higher this week.

PIG IRON.—Southern iron appears to be getting most of the business going, and several good sized sales have been made, one of them for 2,000 tons. Quotations have been advanced from 75 cents to $1 a ton, and it is expected they will be put up again in the near future. Freight rates from the South will be higher by 40 cents a ton after Sept. 16, as announced this week. For this reason the Southern furnaces are not at all anxious to secure orders at the present prices except they be for small lots and for delivery before the 16th. Some of the Southern furnaces are reported as being out of the market entirely, and others have only a few grades of iron to offer, being sold up on others. It is reported that the Illinois Steel Co. is in the market for from 10,000 to 15,000 tons of Southern low silicon iron, and that it will probably buy this week. Of this, however, nothing very definite could be learned from the steel company. Sales of local iron were very fair last week, and the inquiry is fully as large as expected. Quotations are very firm, and one furnace is holding out for higher prices than those we quote. Sales of Lake Superior charcoal iron were very large last week, and several round lots were contracted for. This is to a great extent because the price of charcoal iron is so much lower than Bessemer, and because large consumers of charcoal are coming into the market who have not bought for some time. Prices of charcoal iron were also advanced last week. The local furnaces are entirely out of the market on Bessemer, and no quotations are obtainable. Quotations are made as follows:

Lake Sup. Charcoal	$14 50@15 00	Southern No. 2 Soft	$13 25@13 50
Local Coke Fdy. No. 1	.....@14 00	South'n Silveries No. 1	14 75@15 25
Local Coke Fdy. No. 2	.....@13 50	South'n Silveries No. 2	14 25@14 75
Local Coke Fdy. No. 3	.....@13 00	Jackson Co. Silveries	15 50@16 00
Local Scotch Fdy. No. 1	13 50@14 00	Ohio Silveries No. 1	15 00@15 50
Local Scotch Fdy. No. 2	13 00@13 50	Ohio Silveries No. 2	14 50@15 00
Local Scotch Fdy. No. 3	12 50@13 00	Ohio Strong Softeners	15 00@15 50
South'n Coke No. 2	13 25@13 50	Alabama Car Wheel	17 00@17 50
South'n Coke No. 3	13 00@13 25	Malleable Bessemer	.....
Southern No. 1 Soft	13 50@13 75	Coke Bessemer	.....

BARS.—Sales in the past week were mostly for small lots, but a goodly number of these were taken, and a few orders of fair tonnage were placed. The railroads do not seem to be buying very heavily yet, but several of them have made inquiries, and expect to place their orders in the near future. Quotations are unchanged, but the report is current that they were advanced $2 at a meeting of the Merchant Bar Iron Association, held on Sept. 3. Common iron, 1.50c to 1.55c; guaranteed iron, 1.55c to 1.60c; soft steel bars from strictly billet stock, 1.60c to 1.65c.

BILLETS AND RODS.—No sales of any importance of either billets or rods were made last week, and prices have been advanced by the local company to $25 for billets, and $32.50 for rods. Quotations on sheet bars have also been advanced to $27.50, and it is thought that this will shut off inquiry for a little while, at least.

RAILS AND TRACK SUPPLIES.—Orders for rails keep up well, but nothing of any particular note was closed last week. For small lots an advance on the quotations of from $2 to $5 a ton is being asked, and it is thought that quotations may be higher in the near future. They are at present as follows: Rails, $25 to $27; splice bars, 1.50c to 1.55c; track bolts, 2.35c to 2.40c; spikes, 1.95c to 2c.

STRUCTURAL MATERIAL.—The only contract of any importance closed last week was for the Davies building, which will take several hundred tons of steel. The contract was taken by a local company, the steel to come from a Pittsburg mill. Quotations are as yet unchanged, but it is expected they will be advanced any day. They are as follows: Beams and channels, 1.90c to 2c; angles, 1.85c to 1.90c; plates, 2.10c to 2.20c; tees, 2c to 2.10c. Small lots from stock are ¼ to ½c higher.

PLATES.—The local company secured the contract for 1,200 tons of plates required for a steamer, the contract for which was taken by the Chicago shipyards. Aside from this a good general business was done, and the tonnage closed was quite large. Prices are as follows: Tank steel, 2.15c to 2.25c; flange steel, 2.45c to 2.55c; fire-box steel, 2.85c to 5c.; boiler tubes, 60 to 65 per cent discount.

MERCHANT STEEL.—The market is unchanged, the call for material being mostly for small lots. A number of specifications have been received from agricultural implement makers, and it seems probable that this trade will buy earlier than usual this year. Quotations are as follows: Open-hearth spring, tire and machinery steel, 2.10c to 2.20c; smooth finished machinery steel, 1.85c to 1.90c; smooth finished tire, 1.80c to 1.85c; tool steel, 5.50c to 7.50c; specials, 11c and upwards; Bessemer bars, 1.60c to 1.65c.

SHEETS.—The demand for sheets, both black and galvanized, keeps ahead of the capacity of the mills and they are filled with orders for some time to come. Quotations are very firm, and are as follows: No. 27 common iron, 2.85c to 2.90c; sheet steel, 2.90c to 3c; galvanized, 70 and 2½ per cent discount.

OLD RAILS AND WHEELS.—Some dealers are holding old iron rails at $17.50 to $18, but no sales have been made at these prices. An offer made last week to sell old rails at $17.25 was refused by the buyer. It is hardly probable that they can be maintained at this price at present. Old steel rails are in light demand, but are held at higher prices, $13.50 to $15.75, according to length, etc. Old car wheels are rather quiet, and only a few sales are reported, at $11.50 to $12.

SCRAP.—The demand for some grades of scrap is much heavier and prices are higher as a consequence. They are made as follows: Railroad forge, $15.50 to $16; dealer's forge, $13.50 to $14; No. 1 mill, $11; heavy cast, $9.50 to $10; axles, $18; cast borings, $6.75 to $7; wrought turnings, $8.25 to $8.50; axle turnings, $9 to $9.25; mixed steel, $12 to $12.50; stove plates, $6.50 to $7; heavy melting steel, $13.50 to $14.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The excited condition of the market for Bessemer iron has continued through the week under review, with transactions ranging from $16 to $16.50 in the valley and asking prices now upwards of $17 valley furnace. At $16 one 5,000 ton sale was made, deliveries over the next three months; at $16.25 a 10,000-ton block sold, deliveries extending into March. At $16 50 valley furnace a sale of 2,000 tons and one of 5,000 tons are reported. It is known that two large steel companies are still in the market, but they are not disposed to close at the prices furnacemen and dealers are now naming. There is a general feeling now that the advance has been too rapid to be healthy, and yet there is no evidence that any lower basis can be reasonably expected for some months to come. Foundry iron is still slow, but in sympathy with Bessemer quotations have been advanced and for No. 1 the range is now $14 to $14.50 while No. 2 is held at $13.50. The advance in Southern has also contributed to the strong position of local sellers. Gray forge has advanced 50 to 75 cents. A sale of 1,000 tons and one of 500 tons are reported at $12.25, valley furnace and $12.50 could doubtless be secured. Billets have advanced with Bessemer pig. Sales in the early part of the present market week were made at $23 00, Wheeling, and $23.50 Pittsburg, but prices are about 50 cents higher to-day. We note a sale of prompt billets, 500 tons, at $24.25 Pittsburg. A sale of 1,000 tons of sheet bars was made at $24.50. There is no steel for sale by makers. Pittsburg and Wheeling district mills are now quite well loaded up for the rest of the year. In wire rods very little has been done, but a sale of 1,000 tons is reported at $31, with prices going higher. The wire nail men had a meeting here on Tuesday, Sept. 3, and the advance talked of at the meeting two weeks ago was made, namely, to $2.25 per keg, Pittsburg, in carload lots and $2.35, base, less than carload lots. There is some discussion of a possible advance in rails, in view of the fact that they are now only on a par with billets. Muck bar is firmer and a sale of 1,000 tons has been made at $22.75. Structural material has advanced $2 a ton and the minimum quotation on beams and channels is now 1.70c, with 1.75c asked on small lots. On wider than 15-inch prices range from 1.80c to 2c. The strong demand for plates has led to further advances and 1.90c to 2c for tank is now the market, with some mills maintaining the latter as their minimum. Iron and steel bars are in active demand, and an advance of $2 a ton has been made on iron, the minimum for common iron being 1.40c and for steel 1.45c. Railroads have contributed materially to the larger demand. Sheet mills are still pressed to their utmost. Under the wage arrangement with the Amalgamated Association, the Manufacturers' Association is now collecting figures as to mill prices in July and August. If the average of Nos. 26, 27 and and 28 has been 1-10c above 2½c in the past 60 days, the men will be entitled to a two per cent advance. Present prices are: For No. 26, 2.55c to 2.60c; for No. 27, 2.65c to 2,75c; for No. 28, 2.75 to 2.85c. Continued strength is noted in the market for wrought pipe. The output of iron pipe has increased in the past three months, but the demand keeps up. Old material is strong, with light offerings. Old steel rails, $14 to $14.50 for long; old iron rails $17.50 to $18. The seller's waiting game promises to be a winning one. The Connellsville coke output is steady. In the week ending Aug. 24, there were 15,178 active ovens, with 156,238 tons estimated production, an increase of 3,000 tons. Coke labor is uneasy, under the steady advances in pig iron.

Cincinnati. August closed in a whirl of excitement in the pig iron market. Foundry and forge irons were slow to respond to the great activity and rapid advances in Bessemer, but about the middle of last week large buyers began to enter the market, and in 48 hours transactions were closed of such magnitude as to compel furnaces either to further advance prices or to withdraw from the market entirely. The leading Southern sellers closed over 50,000 tons in four days, all at full figures. Other furnaces, North and South, sold proportionately. On Saturday advances were announced ranging from 50c to $1 per ton in leading grades of Southern foundry and forge iron. Gray forge and mottled being in active request, were advanced most. Another important feature of the situation was the announcement Aug. 30, by the Southern railroads of an advance of 50c per ton in freight rates, effective Sept. 15. The old rates, it was announced, would be protected on no orders after Aug. 30. The effect of this is to advance the price of Southern iron to a Northern consumer from $1 to $1.50 per ton. At Pittsburg, $17 has been had for Bessemer iron, September delivery. One furnace operator describes the market as ranging anywhere from $16 to $20 for standard Bessemer. There are many who deprecate any excitement and warn producers against a too rapid advance in prices, but the inexorable law of supply and demand is the only influence that can govern. If demand continues to increase, prices must further advance. There is, of course, an urgent tendency to start up idle furnaces, but the difficulties of procuring ready supplies of ore and coke prevent, or greatly delay, the realization of plans. Meantime, consumers are likely to have some difficulty in supplying their wants, should general business continue to expand at the present rate.

Buffalo. We note an increasing volume of business and more inquiries for future delivery than at any time since the market paused a few weeks ago to take breath after a short, rapid career. Locally all lines are melting large amounts and participating in the improvement of price, although the jobbing foundries are finding competition sharp, and indications that all shops are not yet filled up. All Southern soft iron has advanced $1 a ton, and prices are unusually firm at the advance. We are given to understand that those Southern roads which would not enter into agreement for advance in the rate of freight, have now expressed a willingness to join in an advance of 50c per ton. The railroads have felt for some time they should soon obtain their share of the better times. This advance in freight, and the actual scarcity of soft Southern iron have caused the furnaces to refuse all orders except at the full advance in the price.

St. Louis. Things warmed up at the close of last week in a way that was to many a surprise. Those, however, who have been watching the market for some time were looking for sudden changes. Southern irons have advanced about $1 per ton. No very large quantities were sold in this market, but the demand is good and slowly increasing.

THE 69th meeting of the American Institute of Mining Engineers will be held at Atlanta, Ga., beginning Oct. 8, 1895. The provisional programme, in addition to the usual sessions, includes a thorough examination of the Cotton States and International Exposition, a visit to the granite quarries at South Mountain, a trip to Chattanooga and excursions to several battlefields.

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PUBLISHED EVERY THURSDAY BY
THE IRON TRADE REVIEW CO.,
CLEVELAND, OHIO.

CLEVELAND: 27 VINCENT STREET. A. I. FINDLEY, Editor.

CHICAGO: 1142 MONADNOCK BLOCK. B. M. GARDNER, Associate Editor and Western Manager.

ENTERED AT THE POST OFFICE IN CLEVELAND, O., AS SECOND CLASS MATTER.

SEPTEMBER 5, 1895.

SOUTHERN IRON FOR BASIC STEEL.

The sale of 25,000 tons of low silicon pig iron made last week by the Tennessee Coal, Iron & Railroad Co., to the Carnegie Steel Co. is an interesting development of the time. The heavy demand upon Pittsburg steel works and the success of recent efforts at Birmingham to produce pig iron adaptable to basic open-hearth work, opened the way for this shipment to Pittsburg, which if it is completed will be the largest that has gone into that district from the South. The contract calls for 25,000 tons, to be shipped at the rate of 4,000 tons a month. There is a stipulation as to the maximum percentage of silicon, phosphorus and sulphur which the metal is to contain. The privilege rests with the buyer for one month after shipments begin, to cancel the order if the metal does not work satisfactorily, even though its composition may be within the contract guarantees. Birmingham furnacemen have for some time been able to make, from selected brown hematite an iron low enough in silicon to permit of working in open-hearth furnaces, but their latest experiments have demonstrated to their satisfaction that they can make a basic pig, and guarantee it as to silicon, phosphorus and sulphur, from the Red Mountain ores which are the staple ores of the district. The iron for the Pittsburgh shipment will be of this latter description. It is understood that the question of price was an important element in the transaction; but with the shipping company any consideration of profit is quite secondary to the demonstration which it is hoped to make that Alabama iron can meet the requirements of the basic open-hearth steel maker. And this demonstration once made will become of value to the South in proportion to the utilization of this iron in basic steel plants operated in the South. Meantime another deal is pending for the shipment of low silicon Birmingham iron to a Northern steel works, the Chicago district being its reported destination.

WILL PRESENT DEMAND KEEP UP?

There is this to be considered about the demand for finished material of all descriptions that has astonished many by its persistence in the summer months: Its volume is out of proportion to the regular consuming capacity of the country, unaided by considerable investments of capital in new enterprises calling for iron and steel. The dam that had been holding back wants involving tens of thousands of tons broke when the advances in Bessemer iron ore and coke, last spring, notified buyers that the end of the decline had come and that an up grade was ahead. It is this accumulation that has given the iron trade what seems a flood tide of prosperity, in contrast with the rocky shallows of not long ago. Latterly the railroads have been recognized as contributors to the general volume of business that was before so composite as to baffle investigators who sought to know its source. And it is the general expectation that with the large purchases the Western lines are counted on to make in the next six months, there will be a reinforcement of the stream of miscellaneous buying at a time when it might be expected to settle into narrower channels. But it is to be borne in mind in any calculations for the later future that there is no present warrant for expecting any large outgo of money now idle, into industrial ventures, or into new railroad lines. There is too much idle manufacturing capacity in the country to-day to justify any large hopes in this direction. Moreover, the wage advances have been so largely in one line that the aggregate purchasing power of the country is far from being so close to the normal as glowing newspaper statements would imply.

RELATION OF EMPLOYER AND EMPLOYE.

The comparative infrequency of strikes to gain the advance in the wages of iron workers which have been reported weekly in the past three months has been commented on not a little. The fact that nearly all the advances have been given voluntarily, and that in very few instances have employes had to ask for them, ought to answer a good deal of the drivel of the agitators who would have wage earners believe that labor gets nothing from employing capital that is not wrung from it by strong organizations and determined demands.

Whether the events of the past few months will result in any permanently improved *modus vivendi* between the firms that have advanced wages, and those in their employ is yet to be determined. Certainly where both sides have suffered together as keenly as in the past two years, the feeling of antagonism of which one ordinarily sees so many evidences might be expected to abate. All theoretical consideration of the relations of capital and labor recognizes that their interest are not opposing but conjoint. Advocates of profit-sharing and other methods of expressing practically the interdependence of labor and employing capital, often refer to their interests as "common;" but to speak of identity of interest is not an exact expression of the relation. The interests of the two are complementary rather than common.

In his Fourth of July address to his workmen, given in part elsewhere, Mr. R. T. Crane, of the Crane Co., Chicago, speaks of the employer as the customer of the employe, as the one who furnishes the market for the employe's labor. This relation, he argues, would naturally suggest that the employe have the same desire to maintain pleasant relations with his employer that the manufacturer has to be on a good footing with the buyer of his product. The comparison while imperfect, for the reason that it makes labor a commodity and nothing more, is at least suggestive of the inadequacy of the communistic conceptions that ignore entirely the buyer and seller idea, in their proposals for eliminating antagonisms between wage-earners and those who employ them. There is not an identical interest in the case of the man who sells a house and lot and the buyer of the property, one being interested in getting all he can and the other in getting the property at the lowest price. No more can buyer and seller of labor see through the same eyes.

Perhaps the modern organization of business has added to the chances of antagonism, in the supplanting of the small shop, with the employer working side by side with

his men, by the heavily capitalized concern of large output, with the large stock holdings in the hands of persons whom the wage-earner never sees and does not know in the relation of employers.

Mr. Crane has had ample opportunity to watch the changes of which he speaks and his opinions on this vital problem are suggestive and so well worth reading that we give up considerable space to them in this issue.

THE ridiculously exaggerated statements that find their way into print, in the current comment on the prosperity of the iron trade, are the bane of the business. For example, the paragraph in a Pittsburg paper this week, that the Carnegie Steel Co. has contracts on hand for 1,000,000 tons of structural material! Including plates, there has not been that amount of structural iron and steel rolled in the United States in any year. All such boom statements come back upon the manufacturer in unwarranted wage demands. The situation is good enough without any attempt to assist it with fairy tales.

THE CLEVELAND DISTRICT.—**Continued from page 3.**

in the valley, an advance of 50 to 75 cents. Lake Superior charcoal is higher, and sales are reported at $14, Lake Erie port. Last week's transactions indicate, however, that some furnaces are not yet up to that point. In the week, Mary furnace at Lowellville has resumed on Scotch iron, and later will change to Bessemer. The new Spearman started on Bessemer. Another Shenango valley furnace will go from foundry to Bessemer this week, in addition to the Western Pennsylvania stack referred to last week.

Finished Material.

The meeting of the Merchant Bar Iron Association in Cleveland, Tuesday, advanced the price $2 a ton, making 1.40c the Cleveland price of common iron. Steel bars are higher; the Pittsburg range being 1.45c to 1.50c, while 1.58c Cleveland is maintained by some sellers. There is some inquiry for iron on agricultural and car account. It is probable that many contracts for a year's supply could have been closed in the past two months but for the refusal of mills to accept business so far ahead. The result of recent advances may be that some of these buyers will follow the market instead of covering for 12 months. Beams and channels are $2 higher and 1.70c Pittsburg is maintained as minimum by most mills, though 1.65c has been done in the week. Plates are 2c, 2.10c and 2.20c Pittsburg for tank, shell and flange respectively, by some mills, but others are about a tenth lower. The Cleveland minimum is now 2c for tank. Inquiries by railroads are steadily increasing in volume and considerable purchases of plates and bars and miscellaneous supplies are promised for the present month. Representatives of Western forges met in Cleveland this week and decided to make an effort to stiffen prices on axles. Another meeting will be held in Chicago early in October. Buyers of soft steel have encountered a firm market in the week. Some Cleveland transactions are pending, with quotations made this week at $24 delivered. Little steel is to be had and the ideas of some mills are higher than the prices named. A sale of rods has been made at $31; the present quotation is $32.50.

THE Benjamin Iron & Steel Co. has been organized at Buffalo, N. Y., to deal in iron and steel and has arranged extensive yards in East Buffalo. The new firm succeeds to the business of Gus Benjamin, and will include David Shire of Buffalo and Cornelius J. Kane of Pittsburg.

LAKE SUPERIOR IRON MINES.

With the decision of the mining companies operating at Ishpeming and Negaunee, to start loading ore from their stock piles on Monday, Sept. 2, the end of the Marquette strike came plainly in sight. The report that the men had determined to resist the resumption of work at the stock piles led to a call upon the militia and early Monday morning, Sept. 2, five companies of Michigan soldiery arrived at Ishpeming. The old steam shovel men, many of whom wanted to go back to work, were kept from doing so by the action of the strikers and the mining companies set men at work who were brought from Minneapolis, Chicago, and elsewhere, the militia protecting them. At a meeting of the strikers at Union Park, Monday, their leader Coad urged that no attempt be made to interfere with the steam shovels. This advice was adopted. Coad asked the men whether they would return to work in case the companies would compromise on a figure between $1.70 and $2. This was negatived. Coad then resigned and John Roberts, the strikers' secretary, was chosen in his place. Shipments were made on Monday from the Salisbury, Lake Angeline and Lake Superior, each sending out several hundred tons. No attempt has been made as yet to evict strikers from the company's houses. Miners are leaving the range almost daily, and from 500 to 700 have gone to other ranges, where labor is in demand, or to mining camps in the West. The question still unsettled is whether enough miners can be secured among those who remain, to operate the properties. The continued depletion of the strikers' ranks may soon bring them to a point at which a majority can be secured for a proposition to return to work at the price offered.

General Freight Agent Orr, of the Duluth & Winnipeg, corrects the report that a 60 cent rate is made by that road and the Duluth, Mississippi & Northern on ore from the Mahoning mine to Superior. The rate is 80 cents as on ore hauled by the other two roads.

Capt. J. H. Pearce, formerly in charge of the Commodore, has been sent from the Gogebic range to Biwabik to open up the Williams forty of the Cincinnati. A hoisting plant consisting of engine and two four-foot drums will be put up at the mine. The old No. 3 shaft will be deepened and a new shaft house built.

At the Aurora mine on the Gogebic 350 men are now at work. The taking of pillars, now in progress, is rendered slow and difficult by the number of levels opened before robbing began and the ground is apt to come too quickly.

At the Hale mine, on the Mesabi, the daily output is about 500 tons. The milling system is employed and stripping is going on, the surface being from four to 10 feet.

The Duluth, Mesabi & Northern road has reported to the State earnings of $458,534.62 in the first six months of 1895. This represents only two months of ore shipments.

A building 45x50 feet is under way at the Pewabic mine, Iron Mountain, Mich., to accommodate the new pumping plant which will be put in October. A triple expansion pumping engine with surface condenser will be put in. The dimensions are 15, 23 and 38 by 12 and 24; the capacity will be 1,500 gallons a minute. The lift is 700 feet. There will be two boilers of 200 h. p. each. The *Range Tribune* says: "The Pewabic company is now pumping about 1,000 gallons of water per minute, and with the new plant in operation will have a capacity for handling 4,000 gallons. The immense inflow of water is the most serious problem with which the mines of this district have to contend, and thousands of dollars are expended annually in keeping them from flooding. Superintendent Brown is of the opinion that, with the new plant in operation, it will no longer be necessary to dam the water back, but the dams will probably be maintained unless it is deemed advisable to open up that portion of the mine again."

Up to Sept. 1 shipments from the Pewabic were 193,000 tons. The daily output is 1,200 tons and 580 men are employed.

The Commonwealth Co. has sent out from its Badger and Commonwealth mines this year about 135,000 tons of ore, and has about 100,000 tons still in stock.—[Norway Current.

Water on the second level has caused considerable clogging in the chute at the Auburn property. The day of regular underground mining may yet come at this property.

IMPROVED MOLDING MACHINE.

The illustrations give sectional and plan views of a molding machine designed by P. F. Walstrom, of Birmingham, Ala. Simple and inexpensive operation and the simultaneous performance of the various operations connected with the pressing of the molds, the placing of empty flasks, application of power to the pressing plunger, and riddling and conveying the sand, are the chief claims of the inventor. In the illustrations, Fig. 1 is a vertical side view of the machine; Fig. 2 a cross-sectional view through the center of the column and sand bin; Fig. 3, a top view of the machine as shown in Fig. 1.

The base plate 1 is made of cast iron and has formed in it a raised track 2 on which a cast iron turn table operates. The turn table is provided with a hub from which arms radiate, provided at their ends with box-like formations, 4, to which the molding tables are secured by bolts. A metallic column 5 is secured to the base plate, extending upwards through the

Fig. 1.

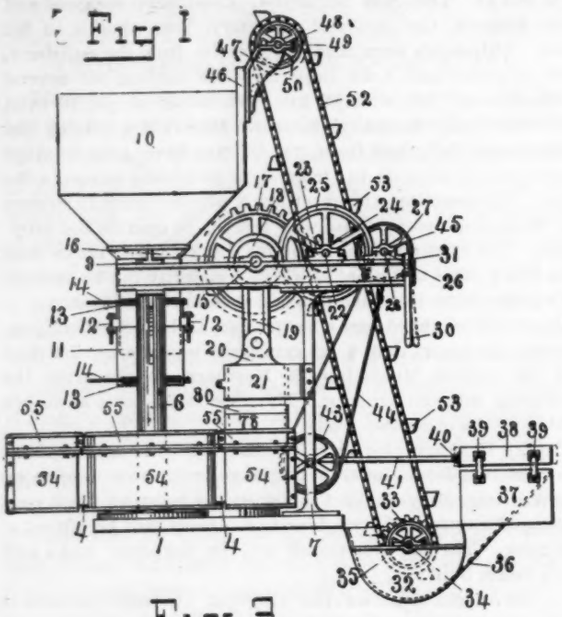
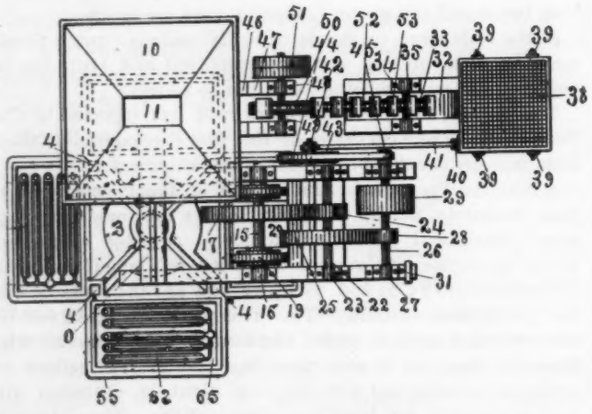


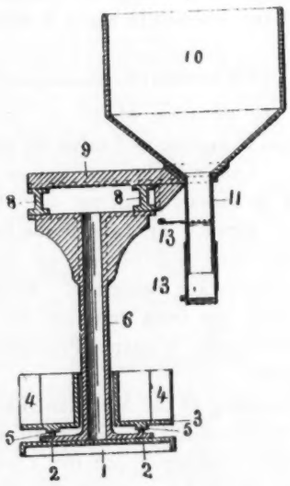
Fig. 3.



hub of the turn table and a metallic web column 7 is secured near the end of the base plate. These are connected by I beams, 8, 8, and the frame work thus provided supports the sand bin 10 and the gearing connected with the conveying and riddling of the sand and the rotating of the tables. The sand riddle is 38, and the means of providing the shaking motion is apparent on referring to Fig. 1. The main shaft 15 is journaled in bearings formed in the beams. It has secured on it a gear wheel 17 and two cams 18, which are connected by pitmen 19 with a pressing plunger 20. There is also a shaft 22, carrying a gear wheel 24 and a friction wheel 25. The shaft 26 has a small friction wheel 28, connecting with the friction wheel 25 and the driving pulley 29. A hand lever 29 puts the machinery in motion by bringing the friction wheels in contact.

The molding tables when used to mold sash weights, have a series of metallic patterns 62 connected together by bars, the latter being connected to the elevating frame by bolts. The connection is made in this manner to facilitate the changing of the patterns. A metallic top plate 65 is provided with a series of apertures for the patterns to pass through. The table has an outside frame with an inner frame supporting the top plate. Flanges provided with gibs on the ends of the inner frame extend through apertures in the outer frame. A shaft journaled in bearings formed in the frame, and cams, inside and outside, secured on the shaft under the flanges, operate the frame and raise and lower the top plates. The movement of a hand lever at the side of the table, revolves the shaft one-fourth of a revolution, drawing the patterns down one-half the throw of the inside cams. The outside cams having no throw on the first quarter of the shaft revolution, hold the inside frame and top plate to place. The inside and outside cams having the same throw on the next fourth of the revolution, draw the patterns and top plate down at the same time to clear the sand of the mold. The remaining half

Fig. 2.



of the shaft revolution reverses and elevates the patterns and top plate in the reverse manner. The corners of the inside elevating frame coming in contact with the inside frame help to elevate it on the last fourth of the revolution, and remain in contact with it until the pressing is completed.

A flask is placed on the top of each table before it reaches the sand chute. The flask is held to place by flask pins inserted in the rim of the molding table frame. On the top of the flask a loose box is placed, to keep the sand from spilling over the edges of the flask. As the flasks are filled the turn table is revolved bringing the full flask under the pressing plunger, the pressing of one flask, the filling of another with sand, the removal of a pressed flask, and the placing of an empty flask on one of the tables, all taking place at the same ime.

CAR and locomotive building: The Illinois Central has ordered 18 locomotives from the Brooks Locomotive Works and 12 from the Rogers Locomotive Works. Twenty more will be wanted later. The Richmond Locomotive Works has an order for eight additional engines for the Southern Railway. The Intercolonial Road placed orders for 275 cars, dividing them between Rhodes & Currie, Amherst N. S., and the Rathbun Co., Deseronto, Ont. The Bloomsburg Car Mfg. Co. has an order for 200 cars from the Lehigh Coal & Navigation Co., and for 100 cars from the H. C. Frick Coke Co. The Minneapolis & St. Louis has ordered 100 additional box cars from the Duluth Mfg. Co.

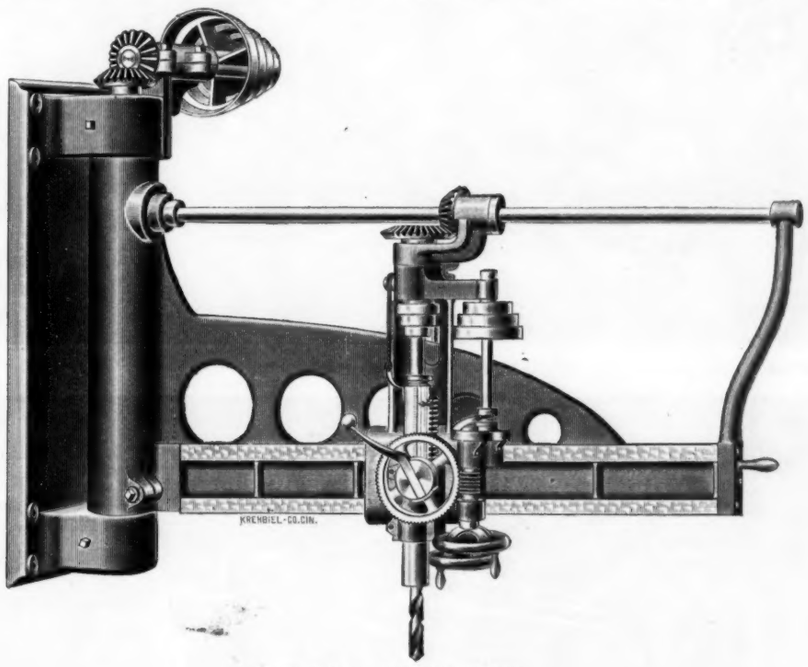
ON Thursday, August 29, at 3.45 P. M., the fan at the Thos. D. West Foundry Co.'s foundry at Sharpsville, Pa., suddenly became useless. Ten minutes later a representative of the company was on the train for Cleveland, 85 miles distant, to purchase another. The new fan was shipped at once and by four o'clock of Friday, 24 hours after the accident, was in position and a heat was under way.

PIG iron warrant stock, Aug. 31, 115,600 tons.

NEW WALL RADIAL DRILL.

A new post or wall radial drill has just been brought out by the Bickford Drill and Tool Co., 530 East Front st., Cincinnati, designed for drilling, reaming, and countersinking large work in boiler shops, bridge shops, architectural iron works, ship yards, etc. The bracket which supports the radial arm can be bolted with its broad and long bearing to a post or a wall, or if put up in a gang clamped fast to two flat-lying I beams. The head is movable on the arm by means of rack, pinion and hand wheel, and can be securely locked to it. The arm can be secured rigidly to the wall plate by means of a clamping screw. The spindle has power feed, hand feed, quick-return motion and automatic stop.

The machine has four different speeds, and three different feeds for the spindle. The spindles are counterbalanced. The distance between bearings on the wall plate is 3 ft.; length of wall plate, 4 ft. 4 inches; width of wall plate, 1 ft. 4 inches; length of radial arm from center of trunnion to end, 6 ft.; vertical range of spindle, 10 inches; cone pulleys, four changes, 6, 8, 10 and 12 inches; width of belt for cone pulleys, 3 inches; size of tight and loose pulleys, 14x3¼ inches; speed of countershaft, 200 revolutions. The manufacturers



NEW WALL RADIAL DRILL.

will furnish prices and other details on wall radial, multiple, upright, universal radial and boiler-makers' drills, also boring and turning mills.

Hard Copper Castings.

Experiments made in the past few years have resulted recently in the discovery of a method whereby pure copper castings may be made, that are hard and homogeneous, and have great strength and durability. The process was discovered by Albert E. Lytle, of Chicago, and is now owned and operated by the Chicago Hard Copper Co., of which Mr. Lytle and Gen. Green B. Raum are the managers. The company has established a foundry at the corner of Market and Monroe strees, Chicago.

The mode of treatment is to introduce into the melted copper the "bolus" which is to effect the change in the metal. The metal is then stirred for a short time and in about ten minutes it is ready to be poured. It can be then used for making castings, or cast into ingots for remelting for future use. It is claimed that the treatment can be applied to large quantities of copper in a furnace with the same effect that is produced upon small quantities in crucibles.

The effect of this process of treatment is immediate. The metal flows with greater freedom, and leaves but little trace in the crucible; the improvement in certain qualities in the metal is unmistakable. Castings made from the treated copper are smooth and free from blow holes; the metal is rendered homogeneous and its cohesion is perfect. The claim that copper treated by this process is greatly increased in strength is borne out when the tested metal is examined. The various samples of treated metal which had been subjected to severe tests of bending and twisting without fracture show that the treatment gives it great resistance to injury by hard usage. A number of samples of treated copper have been worked in the planer, the die and the lathe with entire satisfaction. The castings of segments for commutators are very handsome. It is obvious that these castings were not case-hardened. The metal is the same throughout and it is claimed that segments made of the treated copper will be of uniform hardness and wear evenly.

Personal.

D. L. Cobb, the Chicago agent for the Sloss Iron & Steel Co., with office at 1142 Monadnock Block, has made arrangements recently whereby he will sell, in addition to Sloss iron, Eagle Lake Superior charcoal iron, Seneca Ohio strong foundry and Bessemer iron, Globe Jackson County, Ohio, high silicon silvery iron and Connellsville coke.

George H. Hull, president of the American Pig Iron Storage Warrant Co., of New York, has returned from a tour in England and France. Mr. Hull reports that a sample lot of 100 tons of Sloss pig iron was distributed among a number of foundries in the Glasgow district, and that very favorable reports had been received concerning it. The rise in prices here has, of course, put further shipments out of the question. —[Iron Age.

H. C. Frick sailed from Southampton for New York, Aug. 31.

Charles F. Mattes, third vice president of the Lackawanna Iron & Steel Co., died at his home in Scranton, Pa., Sept. 3, aged 78 years.

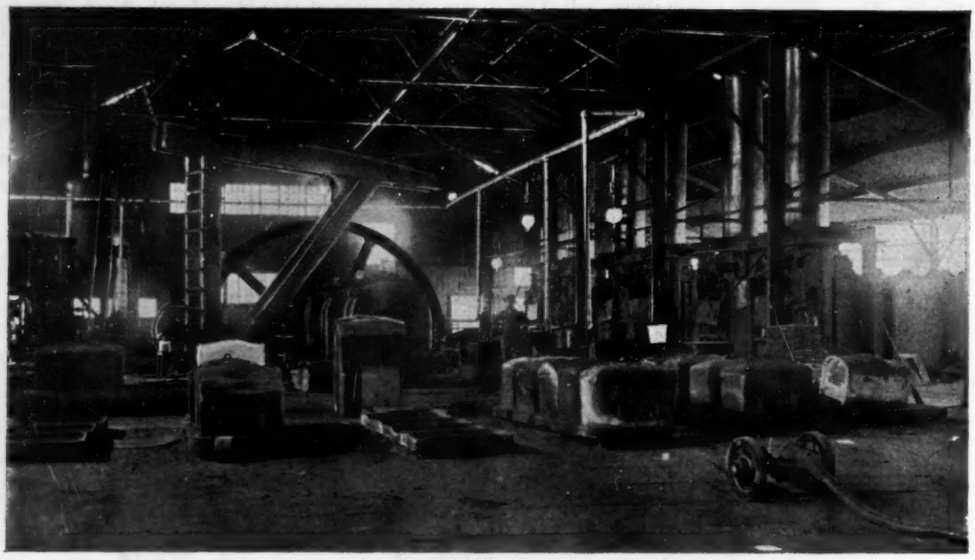
A. C. Bates has been appointed Western representative o the Empire Boiler Cleaning Co., New York, making his headquarters in Cleveland, 35 Wade Building.

President Wm. Edenborn, of the Consolidated Steel & Wire Co., has heen in Cleveland this week on business connected with the resumption of operations at the Baackes plant acquired by the company recently.

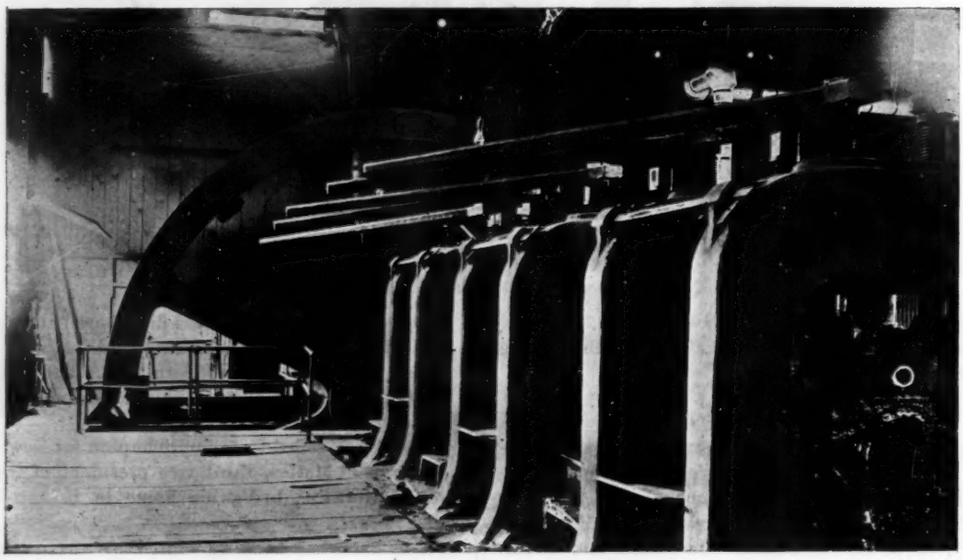
J. G. Butler, of Warren, O., who died Aug. 21, aged 81, was a pioneer in the Lake Superior iron industry. The *Bulletin* says: "All of the pioneer iron enterprises in the Lake Superior region were bloomary forges, the intention having been to build up an iron industry similar to that of the Lake Champlain district. Several of these forges were built in Michigan between 1847 and 1857, but all were abandoned before 1860. A forge on Dead river was built in 1854 or 1855 by William G. McComber, Matthew McConnell and J. G. Butler. In 1860 Stephen R. Gay erected Bancroft furnace on the site of the forge."

AN OHIO TIN PLATE PLANT.

The accompanying views are of the black plate mills and the cold rolling mill of the Morton Tin Plate Co., of Cambridge, O. They are taken from a booklet recently prepared by Ambrose Beard, Jr., manager of the company, under the title "How Tin Plates are Make." In his description of the work in these two departments, prepared for the benefit of tin and terne plates, Mr. Beard says: "The first process consists in passing heated steel bars sideways through chilled rolls. When reduced to the required thinness, they are placed together in pairs, doubled and re rolled until the weight per square foot of surface is according to specifications. After being trimmed, the sheets are taken to the pickling house and treated with sulphuric acid to remove oxide; after which, they are packed in cast iron annealing boxes made air-tight with sand and are placed for twelve hours in an annealing furnace. When properly annealed and cooled the plates are taken to the cold rolling department and are passed through highly polished chilled rolls screwed tightly together. This operation places a fine gloss upon each sheet, after which the annealing process is again resorted to and the final tempering is obtained. The last named process completes the manufacture of what are commercially known as black plates, and they are ready to enter the tinning house. Throughout each stage the utmost care and cleanliness is necessary to produce perfect results." Manager Beard, of the Cambridge plant, comes of a family of tin plate makers. His father is connected with an Indiana gas belt plant, and the pamphlet states that 100 years ago his great grandfather rolled tin plate at a little mill operated by water power, near Framilode, Gloucester, Eng.



BLACK PLATE MILLS.



COLD ROLLING MILLS

WESTERN FOUNDRYMEN AT MILWAUKEE.

Arrangements for the meeting of the Western Foundrymen's Association at Milwaukee in September, have been progressing very satisfactorily, and Secretary Johnston, of the association, reports that a large number of foundrymen from Chicago and vicinity have expressed their intention of being present at the meeting.

The meeting is to be held on Sept. 18, and foundrymen who start from Chicago will go to Milwaukee on the Goodrich line of steamers, leaving Chicago at 8 P. M., Tuesday, Sept. 17, and arriving at Milwaukee on Wednesday morning. Arrangements have been made with the Goodrich line for a reduced round trip fare of $1.25, and berths can be procured for 50 cents each way.

The first session of the association will be held in the parlors of the Plankinton Hotel, at 9:30 A. M., Sept. 18, and at this two papers will be read, one by H. Hansen on "False Economy in Foundry Equipment," and another by A. Sorge, M. E., on a subject which will be announced later. It is expected that this session will last until noon, and immediately after lunch the members and their guests will visit the works of the Edward P. Allis Co., by invitation. Later an electric car ride will be taken around the city. The evening of the first day will be devoted to a banquet, which will take place at the Plankinton Hotel, at 7:30. A number of prominent foundrymen have consented to speak at the banquet, and this session will undoubtedly be interesting. The second day will be devoted to visiting other foundries. The secretary, S. T. Johnston, 1522 Monadnock Block, Chicago, will consider it a favor if all who intend to be present will notify him, so that he can make arrangements for accommodations.

RELATIONS OF EMPLOYER AND EMPLOYE.*

BY R. T. CRANE.

The Fourth of July is a day which ought to be entirely devoted to the subject of patriotism; but it has seemed to me that "The Relations of Employer and Employe" is a subject which is not inappropriate for the day, and that the 40th anniversary of the day I started in business for myself is not a bad time to give you my views on the subject. It so happens that just 40 years ago to-day a furnace which I had built for a brass foundry was ready, and I was so anxious to see that it worked all right that I took off my first heat on the Fourth of July, 1855.

I commenced business as hundreds of others have done before, and in the smallest sort of a way, having no one but myself to act as molder, furnace tender, casting cleaner and everything else. This business, as it now stands, you are all acquainted with. To build up such a business from nothing, even in 40 years, has been no small task and it has not been accomplished without an enormous amount of hard work and anxiety; but, on the contrary, it has suggested to me many ideas regarding the matter about which I am to speak.

Articles are appearing from time to time in various publications, wherein the writers assume that there is now a greater difference in wealth between the rich and the poor than there was say forty years ago, and arguing that there must be something wrong in the relations of the employer to the employe. That there is a greater proportionate difference now between a very *few* rich men and the poor than there was 40 years ago I fully admit. But that the average manufacturer is to-day more prosperous, as compared with the workingman, than he was 40 years ago, I deny most emphatically. Manufacturers generally have enough to contend with in maintaining their business, without being handicapped by charges made by persons who have not a proper conception of the subject upon which they are writing. The employer does not force himself upon the employe. He is simply an indispensable agency which the workingman must use to get his labor on the market. Through him the workingman is able to apply his labor to the raw material furnished by the employer, and, by the sale of the finished article, get his wages out of the consumer; and the workingman has no right to complain unless the manufacturer charges him too much in the way of a tax. In return for this tax the employer is bound to use good judgment in buying machinery and material out of the capital he furnishes and must study the market constantly. He must also be keen to stop all leaks and quick to adopt all known agencies for promoting his business. He must be continually inventing new devices for manufacturing, as well as devising new articles to manufacture. He must be successful in his selection of superintendents, foremen, salesmen and trusty men to handle his money. He must keep up a thorough system and organization and avoid the effect of panics. He must be fortunate in the selection of a location, so that he is at no disadvantage in the manufacture or disposal of his goods. And he must, above all, avoid selling his goods to men who cannot pay for them. If he does all these things successfully, he enjoys a prosperous business and furnishes steady employment to the workingman.

But success in manufacturing is graded from the highest down through many who only drag out a miserable, warring existence, to him who, through lack of capacity or enterprise, fails in business and drags down his employes with him. With the sharp and very extensive competition at present existing in trade, and the numerous people both within and without most manufacturing establishments continually on the lookout for a chance to invade a man's business, there is not much danger of this tax being excessive.

I venture to say that if the manufacturer of to-day should manage his business in the indifferent manner of 40 years ago, it would be a complete failure. When I began business, the manufacturer, as a rule, had a small local territory in which he manufactured and distributed his goods, which he could call his own. But with the advent of railroads and the opening up of new territory, much of which possesses great natural advantages for manufacturing, the employer is confronted with competition from all over the United States, his territory is over-run with the salesmen of distant rivals, and he is obliged to seek a market in every corner of the country. As a result of this competition, the manufacturer, by the employment of this unusual amount of system, skill and ingenuity, has reduced the price of all kinds of productions to an average of about 15 per cent of what they were 20 years ago, and in the meantime the wages of labor have been increased about 75 per cent. No such record has ever been made before in the history of the world.

Only he who has had the experience of building up a successful business can have a proper appreciation of the untold anxiety and worry endured in its accomplishment. I venture to make the assertion that few even of the most successful would be willing to live their lives over again and go through with this experience. Often, after a life of toil and self denial, the successful manufacturer has very little outside of his manufacturing plant to leave to his children, and this in after years is often lost for want of ability to conduct the business successfully.

On the other hand, there are certain duties which the employe owes to his employer. It may be said that if he fails to perform his part of the contract, that is, give a fair day's work for a fair day's pay, he is just as much of a cheat as the merchant who gives short weight or short measure. Again, the humane employer is entitled to some little interest from the employe in his own behalf, besides his day's work. No employe should tolerate any waste or destruction of his employer's property.

In a comparatively few years past has arisen a somewhat antagonistic feeling between employers and employes, which did not exist when I worked by the day, and which causes, in my opinion, a very unnatural state of things. According to my recollection, the employer used to feel an interest in the welfare of his employes, and the employes also felt an interest in the employer, and would no more allow his property to be wasted than they would their own property, and they felt that when they were paid for an honest day's work they were under obligations to give such work. It is absolutely necessary for the success of each that they work together in harmony, as it is impossible for one to exist without the other; and that being the case, all should recognize that it is for the mutual interest of all that there should be an honest co-operation.

These strained relations between employer and employe in many cases arise during depressed seasons. At such times the manufacturer's trade falls off, his receipts diminish, and if he is to sell his goods at all he is obliged to lower his price and often sell goods at cost or even below cost. In order to keep his plant going and his men at work he is forced to ask something in the way of concession from his men. Notwithstanding these facts, the employes resist a reduction in wages, and "strikes" and "lock-outs" follow, which are most deplorable and which cause great loss, which naturally in great part comes out of the workingman. (The strike which we had in the spring of 1894 cost our company anywhere from $50,000 to $100,000. It probably cost the men as much more.) Is it not plain that during a panic a manufacturer must reduce wages if he would keep his men at work? And is it not better for the employer and employe both that work should go on at reduced wages rather than that trade should be lost, the force diminished, or the factory closed?

These troubles are the torment of the manufacturer's life, or have been for a number of years past. They now seem to be growing less frequent. The workingmen seem to be realizing that just as in prosperous times they are entitled to share in the general prosperity, so in times of panic and depression in business they must share with the employer these losses. Had our men recognized this law of trade during the panic of 1894, they, as well as ourselves, would have saved an enormous amount of money. They must certainly realize that a panic, once started, is beyond the control of any employer, and can only be weathered by economy and retrenchment on the part of everybody.

The workingman is dependent upon some one to employ him and in that way put his labor on the market, and it is no more natural that he should antagonize the person who employs him and puts his labor on the market than that he

*From an address by R. T. Crane, president of the Crane Co., Chicago, to his employes, July 4, 1895.

should antagonize the person who bought his wares in case he were in a position to market his labor directly. That is to say, if you were in a position to manufacture a wheelbarrow and came to me to sell it, you would think it was to your interest to treat me with the usual courtesies that are common in trade. But when I put you in the shop and employ you to make a wheelbarrow for me, then there immediately arises a sort of antagonism, which I think is unnatural. It is no more profitable for you to make it disagreeable for the employer who employs you in this way than it would be for you to make it disagreeable for a person to whom you went to sell your wheelbarrow that you made on your own premises.

Undoubtedly much of this feeling of discontent is due to the apparent disproportion between the fortunes of the very rich men and the means of the workingmen. But is there a reasonable foundation for this feeling against manufacturers?

During the history of mankind there has always been a very great difference in the ability or capacity of men; there have always been leaders and rulers. In the earlier ages these men of strength or real ability were the ones who made themselves or were elected heads of tribes, of armies, etc. These men were always looked upon as an advantage to the weaker men as being able to protect their interests and practically an absolute necessity for their protection. But in this present commercial age this same class of persons have come forward as leaders of great commercial enterprises, and they form the class who have revolutionized manufacturing, the conducting of commercial enterprises and railroads, the production of an immense variety of improvements in connection with inventions. The result has been the manufacture of all kinds of articles for our necessities, luxuries and comforts, and the cheapening of transportation. Many of these have been brought within the reach of the workingman, who in old times would have been obliged to forego them. And while it is true that enormous fortunes have been accumulated, it cannot be denied that the workingman's position has been very materially improved. * * *

Now, if the class of persons of unusual ability, to whom I have referred, had only met with moderate success, or, in other words, had not had anything like the ability that they have shown, and had the condition of the poor been about what it was say 40 years ago, the working people would feel that they had reaped their share of the general prosperity of the country. But the success of these *few* persons has been so great and created such a difference between them and the poorer classes, that, by contrast, it would appear that the latter had not received their share of these benefits.

On account of labor-saving machinery making a disturbance in the labor market at the time it is introduced—that is, throwing a certain amount of labor out of employment—the impression is made on the workingman that the invention and manufacture of such machinery is an injury rather than a benefit. It undoubtedly is a temporary injury to those who suffer in this way. But in time those thrown out of employment find other employment, and although it may not be as good as their old employment, there can be no doubt that the community as a whole is benefited by these improvements. [The speaker here discussed at some length the influence of machinery and cited China as a country in which labor-saving machinery is practically unknown.]

* * * Notwithstanding what I have said about the desirability of large and diversified productions, I am of the opinion that we have gone too far in this matter and that we all work too hard and too long—both employers and employes. So long as one manufacturer works long hours, every competitor is, of course, bound to work just as long; but if every manufacturer were compelled, by a law rigorously enforced, to work his men but eight hours a day, it would be an advantage to the health and comfort of employer and employe alike.

* * * Our forefathers fled from Europe in order to escape the tyranny of the ruling classes there, and undertook to form a government here in which all would be protected in their natural rights, and I think it is fair to say that they were protected in all these rights up to a comparatively recent period. Since then there has arisen a class of people who are undertaking, by various means, to deprive certain ones of them of these rights, and it is the duty of all to make an effort to check this invasion and secure to the individual man full protection in all his rights. The Declaration of Independence says that man is endowed with certain inalienable rights, among which are "life, liberty and the pursuit of happiness." Now, I take it that this means that every man has the right to pursue happiness in every legitimate manner that does not interfere with the rights of others. Some have the idea that right simply consists of might, and much of the conduct and many of the acts of the trades unions are not only extremely brutal, but are cowardly. Great bullies—often in considerable numbers—attack a poor, weak fellow, who is utterly defenseless; they are not manly enough to each take one of their own strength and have a fair tussle, but a number will pounce on one man—and often in the dark—in the most cowardly manner. It is every man's right to sell his labor and do what kind of work he feels able and willing to do to support his family in the best way he can, and any man or any set of men who take it upon themselves to be the guardian of his conduct in this matter are as great tyrants as ever lived on the face of the earth. It will not do for any set of men to assume that they have the right to interfere with his making a contract for his labor, or to say for whom he shall work, or for whom he shall not work, or at what price he shall work, or whether or not he shall work at all; and whenever the time comes that they do so presume to do this, or when a man cannot give a poor boy a chance to learn a trade in his factory—not even his own boy, as has been the case in this country—it is high time that this tyranny is crushed. If it is to continue, then let us wipe out of the Declaration of Independence that among man's rights is "life, liberty and the pursuit of happiness."

When combinations of trades will undertake to prevent persons from going into business, and boycott them and boycott those from whom they buy goods, it is time that some of these fellows were severely punished. It is fast making us a nation of tyrants and cowards.

In conclusion let me suggest that just as surely as the farmer and mechanic and artisan and laboring man make up the mass of the people of this country, just so surely does the future of this country and the continuance of our institutions depend upon their will. If they seek to array class against class, faction against faction, section against section, to adopt and enforce legislation that will deny their rights to one class of a community while guaranteeing them to another class, just so certainly will this republic of ours become a memory, and in its place and on its ruins be created the despotism of anarchy, to be supplanted in turn by the despotism and tyranny of an absolute monarchy. To prevent this consummation it is your opportunity as well as mine not only freely to use the power of liberty, but to deny ourselves its unrestrained license.

Success of the Electric Locomotive.

The recent trials of electric locomotives at Nantasket Beach, near Boston, and at Baltimore, have so satisfactorily demonstrated the superiority of this class of motor over the steam locomotive for short hauls, that it is now very generally admitted that the near future will witness a very extensive application of the new form of motive power for short branch lines, tunnel haulage, elevated roads in cities and the like.

At the Nantasket Beach trial it is stated that a speed exceeding 60 miles an hour was attained; and the experiment demonstrated the utility of this motor for suburban traffic. The system went into practical and regular operation on the Nantasket Beach Railway at the end of June. The test made at Baltimore of the electric locomotive designed to draw trains through the tunnel, 7,430 feet long, in that city, was also highly successful. This and its companion—the first locomotives of the kind ever built—have each two trucks and eight wheels, 62 inches in diameter. Flexibly supported on each truck are two six pole gearless motors, one for every axle. A maximum speed of 50 miles an hour is to be developed, and it is guaranteed that the locomotive will pull 1,200 tons at a speed of 30 miles an hour. When coupled to a six-wheel New York Central locomotive, the electric locomotive pulled it up and down the track at will, against the pull of the steam locomotive.—[Journal of the Franklin Institute.

PHYSICAL TESTS OF CAST IRON.*

BY THOMAS D. WEST.

For the last four years the author has been studying the causes of the erratic results observed in testing the physical properties of cast iron, with the object of overcoming them, as far as possible. All the systems adopted in the past are founded upon incorrect principles, and are not practically adapted to afford any investigator, desirous of obtaining true knowledge of the physical properties of cast iron, any assurance that the tests he may record to-day in defining physical phenomena will not be contradicted to-morrow by himself or some one else.

In papers which the author has presented of late before engineering and foundry associations in the United States, tests and statements have been submitted, and he ventures to prophesy that time will show that the principles advanced in them are correct. Briefly, they are: (1.) All test bars should be of a round form, more especially when they are to be used as universal standards of comparisons. (2.) Test bars should be cast on end, in order to ensure uniform conditions in cooling a bar. (3.) Test bars should be of an area not less than one square inch, and for convenience in molding and handling in testing, he would recommend the adoption of a pattern 1.1284 inch in diameter, an area which is equivalent to a bar an inch square. (4.) Methods for chilling test bars should be so devised that a bar cannot pull away from its chill when contracting. (5.) There should be fluidity strips attached to and cast with test bars, or some method should be adopted so that the fluidity or the temperature of molten metal can be truly recorded at the moment test bars are poured. This is rendered necessary by the fact that the degree of fluidity or the pouring temperature of molten metal affects the strength of test bars, as well as their depth of chill. For the former, however, it is not so important, and unless minute accuracy is required, the fluidity need not be noted. For recording the chill of an iron by means of test bars, however, it is absolutely necessary that some method of recording the temperature at the moment a test bar is poured should be adopted before any value can be be attached to chill records. Experience in heavy founding proves the inaccuracy of the view that any value may be attached to chill records without the metal's fluidity being noted. The writer has lately proved that in all chill work the hotter the metal the deeper it will chill; and this fact well illustrates the absurdity of attaching any value to chill records, without the fluidity of the metal being noted at the moment test bars are poured. As an example of the difference that degrees in fluidity can cause in varying the depth of a chill, the author has found as much as $\frac{3}{16}$ inch difference to exist in the chill between two ½-inch square test bars, cast with the same hand-ladle of iron. The only difference was that the bar which showed $\frac{3}{16}$ inch depth of chill was poured with the metal as soon as it came from the cupola, whilst the one with only $\frac{1}{16}$ inch chill was poured before the same ladle of metal had cooled down too much to ensure a test bar of such a small size running so as to fill all edges and corners of the mold perfectly. (6.) In providing points to measure the contraction of an iron, full freedom should be allowed for the expansion of metal at the moment of solidification. It is wrong to cast test bars between rigid flask ends or yokes, as these do not permit the freedom called for. The property of iron expanding at the moment of solidification has been disputed, but that such is the fact has lately been well shown by E. Duque Estrada, in a paper read before the Engineering Society of Western Pennsylvania, April 18, 1895, and by the author in papers which appeared in the *American Machinist* of Aug. 30 and Nov. 1, 1894. Yoke or flask ends exert a pressure on the body of bars at the moment of solidification, which must have some influence in causing erratic records when testing.

Returning to the subject of casting flat or on end, the author lately discovered that with test bars having an area of one square inch cast flat, there is often a difference in a 1⅛-inch round bar of as much as from 300 to 400 lbs.; in one inch square bars a difference of 200 to 300 lbs., and in ½-inch square bars a difference of 30 to 50 lbs., in testing the upper and under side where a number of the same size of bars had been cast in the same mold, out of the same ladle and at the same time.

The author would call attention here to the question of specific gravity, as it has been claimed that a test bar could not be cast on end, on account of inequalities which would exist in the density of the bottom and upper ends. Some authorities have even asserted that a test bar cast on end, if placed on supports equi-distant from either end, would not break at the point where the load is applied, but at a point an inch or so away from the point of pressure toward the uppermost cast end of the bar. In a long experience with bars cast on end he has failed to find any such condition. Indeed, he has not found any difference in this respect with bars that were cast flat or on end. With a view to thoroughly investigating the matter, he conducted the following experiment, and obtained the information given by the Builders' Iron Foundry of Providence, R. I., as cited below. These are tests which the author presented in a discussion on testing at the meeting of the American Society of Mechanical Engineers, held in New York City on Dec. 3, 1894. In the first test of specific gravity, he wished to call attention to the fact that the specimen used was strictly a parallel gate test bar. He mentions this fact for the reason that in the discussion above cited, one member of the American Society took the position that the specific tests of gun metal were inadmissible proofs to establish any principle, owing to the bottom end of the gun which was cast down being of a more massive nature than the upper end, and hence there was good reason to expect metal to be less dense in the bottom than in the upper end of the gun. The test of the parallel gate which the author conducted shows the fallacy of the idea that the lower end of vertical-poured castings must be of a greater specific gravity than the upper end. In the experiment which the author conducted at his own foundry, he took a gate 6½ feet long and 3 inches in diameter, which had been used for pouring an iron ingot mold casting, and took a test-piece 6 inches from the top, and another 5 feet from the top. The gate was practically parallel, so that, in turning these specimens in the lathe, the same amount of surface was carefully removed from each. The specimens were machined of exact size, and were then delivered to the laboratory of the Case School of Applied Science, of Cleveland, O., to be weighed. The determinations reported by Prof. C. H. Benjamin were as follows:

Weight of top end of gate in vacuum.....1169.468 grammes.
Weight of bottom end of gate in vacuum.....1167.239 "
Volume of top end of gate.....165.722 cubic centimetres.
Volume of bottom end of gate.....165.768 " "

$$\text{Density of top end of gate} = \frac{1169.468}{165.722} = 7.0568.$$

$$\text{Density of bottom end of gate} = \frac{1167.239}{165.768} = 7.0414.$$

Difference=0.0154 only. The plug from the upper end is the denser.

A pamphlet recently published by the Builders' Iron Foundry on "Our Share in Coast Defense" presents a series of tests on the specific gravity of vertical-poured castings, and contains an illustration on the third page showing the position of the casting from which the test specimens were ordinarily taken. The lower test disc was taken about 11 feet from the top of the casting and the upper test 2½ feet from its upper end. The majority of the tests showed the specific gravity of the muzzle specimens to be higher than the breech specimens and also to be harder and of higher tensile strength. This is the reverse of what would be expected. The table

TESTS OF SPECIFIC GRAVITY OF FIRST AND LAST SIX MORTAR CASTINGS.

Number of heat.	Specific gravity of muzzle or top end of gun.	Specific gravity of breech or bottom end of gun.
78	7.238	7.2478
79	7.2436	7.2447
80	7.256	7.269
87	7.2934	7.2882
88	7.278	7.285
89	7.335	7.329
185	7.3263	7.3182
186	7.3325	7.3752
187	7.3104	7.345
188	7.3636	7.3336
189	7.349	7.340
190	7.3345	7.3267
Total	87.6903	87.6524
Average	7.3075	7.3043

*Read before the Autumn meeting of the Iron and Steel Institute, at Birmingham, Eng., Aug. 20-23, 1895.

above shows the average specific gravity of all the casts made for specific gravity of breech and muzzle specimens on the first six mortar castings and on the last six mortar castings made by the Builders' Iron Foundry. For confirmation of all this, reference must be made to the official reports of the Chief of Ordnance for 1890 and 1893.

The above tests and figures indicate that there is no condition which will cause any practical difference in the lower and upper end of long vertically poured castings, in the sense which has been generally accepted.

In considering the above tests of specific gravity in connection with those referring to the density of the lower side of flat cast test bars being greater than the top side, it would at first seem as if the results were contradictory as far as they relate to the enunciation of any law or principle governing the facts of vertical-poured casting. They show the uppermost end to have the greater specific gravity, and that of flat-poured test bars to have the greater strength with the side cast downwards in extension when testing for the transverse strength. The latter is largely due to the bottom portion or surface of flat-cast test bars, being most affected by the chilling qualities of the sand of the mold when it is filled with molten metal. If the specific gravity had been taken from the bottom surface of the gate test bar and gun castings, instead of a few inches in height from their bottom end, as was done, there might have been a difference found in favor of the lower end being the denser. This is, however, doubtful, as the gun and gate specimens had such a small area exposed to the mold's chilling influence, compared to the mass of metal comprising the castings. On the other hand, with test bars cast flat, the reverse occurred, and this is due to the fact that a fair percentage of the metal comprising the test bars is distributed over a large area of mold surface and is affected by the chilling qualities of damp sand. When the specific gravities of long vertical-poured castings are tested a few inches from the bottom and a few inches from the top, the reason for finding the upper end the denser, as exhibited by the tests recorded, appears to be largely due to the law of metal expanding at the moment of solidification. The fact of expansion tending to make the upper end of castings as dense as the lower may be better understood when it is stated that molten metal begins to solidify at the bottom of a mold and rises in height as the solidification continues. The effect of expansion at the moment of solidification as castings "freeze" from the bottom upwards has a crowding action, tending to make the molecules denser as height increases, and thereby to partly neutralise the effect in the difference of the specific gravity naturally expected to exist while the metal is in a fluid state. This explains the results shown in the above tests. The subject is one worthy of study, and attempts should be made to satisfactorily explain, if possible, phenomena which are so different from those generally expected.

Since writing this article, the author has obtained the following results of analyses of the top and bottom piece of the vertical-poured parallel test bar from E. D. Estrada:

	Carbon.	Phosphorus.	Manganese.	Silicon.	Sulphur.
Top piece.....	3.72	0.091	0.31	1.32	0.046
Bottom piece..	3.81	0.085	0.33	1.32	0.047

These results show that practically there is little difference in any chemical constituent that might tend to equalize the specific gravity of the two ends of the vertical-poured parallel gate test bar.

The next point to which the author would refer is that of the question involved in the strength and construction of iron. This suggests the question, is there any form or size of bar that having been proved untrustworthy as a record of degrees in strength of cast iron can truly record the contraction? He is of opinion that there is not, and that any bar that will not truly record one physical quality cannot truly record any other.

In order to test the fitness of any form or size of test bar to truly record degrees in strength of cast iron, there should be some trustworthy standard of comparison. For instance, any one experienced in handling the different grades of cast iron knows that the strength of foundry mixtures should range in degrees upwards, beginning with sash-weight iron, followed by stove plate, light machinery, heavy machinery, car wheel, chill roll and gun metal, the last being as a general rule the strongest mixture which is made in iron founding. If, on comparing results obtained from a test with the above grades of iron, a test bar should not show degrees in strength according with ascertained commercial values, or comparable with tensile tests or with those of hydraulic pressure, etc., it is right to conclude that the size or form of test bar used is wholly unfit to be accepted as one of any value to record either the strength of an iron, or any other physical qualities. If there is any doubt of the accuracy of weighing scales, they are very soon tested by comparison with some other scales, or by placing some well-known weight upon them. No one would ever think of doing with scales what has been done with test bars in the past—simply setting up scales and continuing to use them without knowing that they had been tested by a recognized standard. Is there any one that can prove that heretofore any system of tests to obtain physical qualities of iron has considered any definite quality as a comparison in judging of their correctness? The systems used have simply set up standards arbitrary, and their records were accepted with absolute faith, whether they were right or wrong, just as a man with a cheap watch might make a comparison of time with another poor watch. The first effort to set up a standard of comparison of the fitness of a test bar is that embodied in the principles which the author advanced in his paper on a "Comparison of Strength in Specialty Mixtures of Cast Iron," read before the Western Foundrymen's Association, at Chicago, Oct. 24, 1894.

This subject of testing the physical properties of cast iron sadly needs to be cleared from the befogged atmosphere with which it is at present surrounded. The author trusts that the members of the Iron and Steel Institute will take an active interest in helping to further the progress of knowledge by permitting their experience and talents to enforce the creation of a standard system whereby a universal comparison of the true physical properties of cast iron can be correctly made. Before any true knowledge of the exact physical properties of cast iron can be obtained, it is first necessary to possess some standard that will tend to reduce erratic results to a minimum. The author has found with round bars about 1⅛ inch in diameter, cast on end, that as a general rule two bars cast in the same mold at the same time by the system which he has designed for molding and casting, and which is now being used by the Testing Committee of the Western Foundrymen's Association in the United States, that often there will not be a difference of 10 lbs. in the strength per square inch. Since he designed his system, it has been used steadily in his foundry, with results surprising in the closeness with which two bars cast together agree in giving like strength. The system is so arranged that the chill remains in contact with the test bar until removed by hand. Fluidity strips form a part of the bar, and record very accurately any difference which a practiced eye could detect in the degrees of the metal's fluidity as it stands in the ladle. Tips for measuring contraction are so arranged as to allow full freedom for expansion at the moment of solidification. There is no patent on the system. The general plan of the device was illustrated in the *American Machinist*, Oct. 24, 1894. He has made a few improvements since its publication, mainly in the design of a gate which gives a whirling motion to the metal as it enters the mold, so as to ensure any dirt which may be carried down by the gate being thrown to the center of the mold, and brought to the top, thus ensuring perfect solidity at the point of fracture when a bar is tested. The ability of the founder to obtain solid bars cast on end has been disputed, but the evidence brought forward in this paper shows that this can easily be done. Such a system as that described, ensuring a true record of the physical properties of cast iron, and enabling an experimenter to compare transverse with tensile strength, by possessing bars not having one side 300 to 400 lbs. stronger than another, should possess qualities worthy of consideration by all seeking to remedy the evils and the inaccuracy involved in past methods.

The questions now to be decided are: First, should a standard system possess means to record the fluidity or the pouring temperature of molten metal at the moment test bars are poured? Second, should a test bar remain in contact with its chill until cold? Third, do not the elements, which disqualify a test bar from truly recording the strength of an iron, make it unfit for recording the contraction? Fourth, what is

the best size and form for a test bar to most accurately record the physical properties of cast iron? Fifth, in what position should a test bar be cast, on end or flat?

The writer has endeavored to answer all the above questions, and has presented his conclusions for criticism, to the end that truth may prevail and lead to the recognition of some one standard which can be adopted throughout the world, to obtain accurate records of the physical qualities of cast iron.

PUBLICATIONS RECEIVED.

The 1895 catalogue of Brown & Sharpe Mfg. Co., Providence, R. I., the familiar 3⅝″ x 5¾″ size, with 366 pages. It is to a greater extent than ever a *multum in parvo* affair, the pages being crowded with valuable tables and other information required by the machine shop foreman and workman, in addition to the illustrations and descriptions of the machines and tools manufactured by Brown & Sharpe Mfg. Co. and Darling, Brown & Sharpe. Beginning at one end of the catalogue, nearly half of it is devoted to machine tools, prominence being given to universal and plain milling machines. Starting from the reversed title page at the other end of the catalogue, the small tool section is found, given up to gears and gear cutters, draughtsmen's appliances, wire gauges, etc. A number of new machine tools appear in the company's catalogue for the first time.

Three recent pamphlets of the Philadelphia Engineering Works are devoted respectively to Fly Wheels, Rules and Tables for the equalization of power developed in the cylinders of compound engines, and Condensing and non-Condensing Engines applied to rolling mills. In the last named pamphlet a drawing is given of a tandem compound condensing engine the company is constructing for a tin plate mill. The steam cylinders are 24 and 36 inches, stroke 48 inches. The ratio between the two cylinders is 1 to 2¼ and it is intended to use steam at 100 pounds above the atmosphere at the throttle. The publishers suggest that the engineering of rolling mills and of blast furnaces be separated, letting the expert in each state his requirements whereupon the steam engineer can take up the work and supply the required power, with greatest economy, both in first cost and in ultimate expense. The compound condensing Corliss engine is advocated in place of the old types.

The Joliet Stove Works, of Joliet, Ill., have just sent out a catalogue of their stoves, containing illustrations and reading matter of interest to the stove trade.

A pair of interesting pamphlets come from the National Lead Co., the titles are: "Concerning Babbitt or Anti-Friction Metals" and "Red Lead and How to Use It." The former is directed chiefly to engineers, machinists and engine builders. The Phœnix metal, Babbitt bronze, Babbitt metal, journal metal, bearing metal and other metals manufactured by the company are illustrated and described and the characteristics of good Babbitt are enmerated. The booklet on red lead is devoted to the testimony of various authorities on the best coating for the permanent protection of iron and steel. Red lead, linseed oil and proper application is the substance of the formula as put forth, and the results of tests are added to the pages of testimony, together with descriptions of methods of application and mixing.

The New Era Iron Works Co., Dayton, O., whose gas engine has been illustrated in these columns, issues a handy pocket catalogue describing its construction and operation and citing representative concerns in various lines, that have installed these engines.

During these last weeks of preparation, the work on the grounds of the Cotton States and International Exposition at Atlanta, progresses rapidly. This is especially true in Machinery Hall, where work goes on day and night. Big traveling derricks and cranes move steadily to and fro, on their tracks; hundreds of men are busy, day and night, putting in foundations for exhibits, moving heavy machines into place, and rounding up the work in every possible way. The first boiler was under steam last week, and by this time, others are. The posts and lamp frames for the hundreds of arc lights are up, and the wiring will soon be done. Arc lights are already in use at the various buildings where work is going on at night.

BOILER SHOPS AND THE IRON MARKET.

In its September issue the *Boiler Maker*, of Chicago, makes this comment on the market for plates, tubes, heavy sheets and other material used in boiler and tank manufacture:

"The number of large transactions in plates, sheets, etc., during August was somewhat smaller than in July, notwithstanding the fact that the volume of business was satisfactory. This is to be partially accounted for in two ways. In the first place, a halt or rather slackening is always to be expected some time during the summer. The breathing spell for 1895 seems to have been August. In the second place, there seems to be a disposition on the part of large buyers to play a waiting game, looking forward to a reaction from the universal upward movement of values in all lines. Just how wise such purchasers will prove themselves to be depends entirely on the demand which the fall months shall produce. * * *

"The almost universal experience of large buyers in iron markets, who, in times such as the present, wait for reactions and slumps in which to place their orders, is that they rarely realize when such a reaction has exhausted itself, and as there is apt to be after such a period of falling prices an advance sharper than the former, purchasers having waited and congratulated themselves on the wisdom of their course, are very apt to be caught napping, and frequently are forced to make terms on most any basis. At the present writing the prices of pig iron and billets are higher than at any time since the advance set in. No signs of weakening are visible in any quarter. The peculiar feature of the present condition of boiler and tank works and shops of a similar nature, is that a certain few, notably the larger ones, are fairly overwhelmed with business. The smaller manufacturers still complain of poor business. The explanation of this is that many of the large shops whose practice it is to carry stock, made purchases of material at low prices before the advance set in, and to a certain degree are not figuring the cost of material so much on the present value as the old. Except in some special instances, this is a 'penny-wise and pound-foolish' policy, as no manufacturer is justified in estimating the cost of his new material at anything but at what it can be replaced for on the day of making his estimates. If business continues to be brisk this apparent one-sidedness will be at least partially overcome, as material bought at the figures ruling in the spring will soon be exhausted. As a natural result, the smaller manufacturers and boiler makers will have comparatively little trouble in securing contracts for their share of work."

September magazines: A well known New York lawyer tells the story of "A Famous Crime"—the murder of Dr. Parkman by Prof. Webster—in the September *Cosmopolitan*. A timely article on Cuba is given and there are four full-page illustrations of the famous yachts now so much talked about. Thos. Moran contributes 12 landscapes of Western scenery, illustrating Col. John A. Cockerill's article on "Modern Utah." In *Lippincott's* there are several strong stories. Chas. Stuart Pratt gives the history of "Napoleon and the Regent Diamond." Ellen Duvall writes on "Moliere;" Edward Fuller on "The Decadent Drama" and Elizabeth Ferguson Seat on "The Survival of Superstition." The complete novel is "A Case in Equity" by Francis Synde. The scene is a boom town in the South. The narrative of Napoleon's life is carried in the September *Century*, to the period of the supplanting of the Revolution. There are three complete sketches of fiction by popular American writers. Mrs. Mary Hallock Foote contributes a powerful story of mining life in the far West, entitled "The Cup of Trembling." Miss Sarah Orne Jewett a humorous story of the New England coast, entitled "All My Sad Captains." The third is a sketch by Harry Stillwell Edwards, of negro life in the South. "Hunting Customs of the Omahas," "Recollections of Henry Clay," "The Constitution's Last Fight" and "The National Military Park" (by Gen. H. V. Boynton) are noteworthy articles.

The Chicago branch of the Lodge & Davis Machine Tool Co. reports a marked activity in its business. During the month of August this store made large Sales in every state in its territory, which covers the entire Northwest.

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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

Drawer 382, Chicago, wants to buy a 100 h. p. boiler, and 50 horse power engine.

Benjamin Danforth, Batavia, Ill., is in the market for 4 or 5 h. p. gas engine in good order.

The John Davis Co., 69 Michigan St., Chicago, will buy a second-hand upright engine, cylinder about 9″x15″.

The Leechburg Bridge Co. has been incorporated at Leechburg, Pa., with a capital stock of $20,000, by Andrew Gunder, Frank J. Beale and George Kulpshield.

The Bicycle Keyless Lock Co. has been incorporated at Minneapolis, Minn., with a capital stock of $25,000, by J. A. Folsom, W. A. Chowen and Chas. L. Wright.

The Kuhlman Safety Coupler Co. has been incorported at La Crosse, Wis., with a capital stock of $100,000, by Adolph F. Kuhlman, E. W. Chamberlain, C. F. Klein, W. T. Symons and Jos. Roth.

M. C. Henley, Richmond, Ind., is now engaging in the manufacture of bicycles and proposes to turn out 7,000 wheels annually. His Henley Bicycle Works have ordered from the Lodge & Davis Machine Tool Co., Cincinnati, such machines as are particularly adapted to the manufacture of bicycle parts.

Additions, Enlargements, Removals, Etc.:—

The Garland Chain Co., Rankin, Pa., is making an addition to its plant.

A large addition is to be made to the plant of the Link Belt Engineering Co., Nicetown, Pa.

A machine shop is being added to the boiler works of Henry Brobst, Grand Rapids, Mich.

The Humber Bicycle Co., Westboro, Mass., will enlarge its plant to double its present capacity.

The Howard-Bullough American Machine Co., Pawtucket, R. I., is making additions to its plant.

The Western Wheel Works will add another story to its factory at 132-146 Schiller street, Chicago.

The Hooven, Owens & Rentschler Co., Hamilton, O., will build a new plant in the near future, probably in East Hamilton.

The Consolidated Barb Wire Co. will make additions to its Joliet, Ill., plant, increasing the capacity of the wire mill and wire nail mill.

An electric plant and a machine shop are being added to the Braddock, Pa., plant of the Consolidated Wire & Steel Co. The rod and wire mills are to be enlarged.

P. P. Loomis, of Bound Brook, N. J., will remove his business, the manufacture of electrical machinery, to Newport News, Va., where a new building will be erected.

Important additions are being made to the Lochiel Rolling Mill, Harrisburg, Pa. Five puddling furnaces are being completed, which with other improvements will add 100 men.

New Construction:—

The Milwaukee Bridge & Iron Co. has erected a large and well equipped bridge plant on the site of its old shop.

Snyder & Fisher, Little Falls, N. Y., will erect a new building which will be used in the manufacture of bicycles.

Rouse, Hazard & Co., Peoria, Ill., will erect a new factory for the manufacture of bicycles in the near future. The building will be 60x280 feet.

Work has begun on the foundation of the Westinghouse Electric & Mfg. Co.'s malleable iron works at Wilmerding, Pa. It will be next to the machine shops, will cost $50,000 and will employ 800 men.

The new plant to be erected by the recently incorporated Franklin (Pa.) Steel Casting Co. will be a steel frame with corrugated iron covering. There will be three buildings which will be 45x170, 60x170 and 25x170 feet. The plant will be thoroughly equipped with modern machinery.

Fires and Accidents:—

The foundry department of the Buescher Mfg. Co., at Elkhart, Ind., has been destroyed by fire, with a loss of $1,000.

Fire at the St. Louis plant of the Consolidated Wire & Steel Co. did $15,000 to $18,000 damage to machinery in the nail factory and $3,000 damage to the building.

General Industrial Notes:—

The old blast furnace of the Bellaire (O.) Nail Works Co. has been relined and rebuilt and is now in blast again

The Nicoll, Burr & Co. foundry, at Peoria, Ill., which has been closed for more than a year, is preparing to start up.

The Birmingham (Ala.) Rolling Mill Co., is putting up a 26-inch fire bed mill with 60-inch rolls, and also an additional

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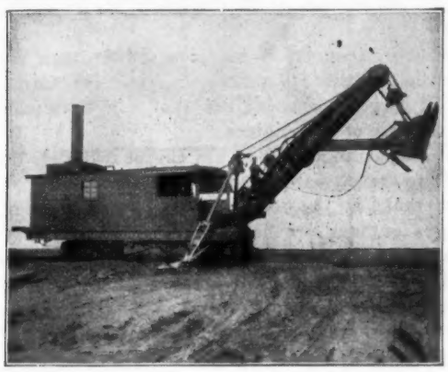

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STEAM SHOVELS	Five sizes for every purpose. Standard Railroad Shovels. Special Shovels to order.
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GOLD SAVING MACHINERY	For Placer Mining. With steam shovels and appliances for disposal of tailings.
WRECKING CRANES	Hand or Steam, 5 to 35 tons capacity. Also Locomotive Cranes and Pile-Drivers.
CENTRIFUGAL DREDGING PUMPS	6-inch to 36-inch. With either simple, compound or triple engines.

SOUTH MILWAUKEE, WIS.

light sheet mill, both to be driven by a 30x60 Corliss engine The mills will be completed by Oct. 1.

The Pottsville (Pa.) Iron & Steel Co. is to be reorganized and taken from the receiver's hands. The plant will then run full.

Every department of the Pennsylvania Steel Co.'s plant at Steelton, Pa., is running full and in some night turns are worked.

A new 20-ton open-hearth steel furnace now under construction by the Pittsburg Steel Casting Co. will produce 40 tons a day, doubling the output of the plant.

E. M. Raynor, for some years in charge of the New York Central machine shops, has rented the Phoenix Machine Works at Syracuse, and will engage in business for himself.

The Ohio Falls Iron Works, New Albany, Ind., have full order books, and are preparing to start their 8-inch guide mill, which has not run for two years. They are purchasing muck bar, their puddling capacity being overcrowded.

Norman Hall, of Boyce, Rawle & Co., owners of Sharon furnace, Sharon, Pa., has filed a bill in equity, asking that the accounts be liquidated and a receiver appointed for the purpose of settling the affairs of the company, in view of the death of the late Mrs. Boyce, a member of the firm.

The Southwark Foundry & Machine Co., of Philadelphia, is putting in eight new compound disconnecting blowing engines of new design at the A B and C furnace plant at Braddock, Pa. It has also received a contract from the Apollo Iron & Steel Co., for two 44x48 Porter-Allen engines.

Dredging has begun on a slip for the West Duluth blast furnace. Docks will be built so that fuel and limestone, heretofore received by rail, can be received by water. The furnace will be put in blast after two years' idleness, as soon as arrangements can be made for its lease from the receiver.

A new company is being formed to manufacture iron and steel skelp pipe in Pittsburg. The pipe and rolling mills of the Oil Well Supply Co., with all the machinery and stock on hand, can be purchased for $500,000, and the Oil Well Supply Co. will accept in payment stock of the new company at par. The plant is subject to a mortgage for $175,000, which will be assumed by the new company. The plant includes a complete and fully equipped pipe mill and rolling mill.

The Pomeroy Iron & Steel Co. has been incorporated by Henry Wick, Myron C. Wick, W. E. Taylor, Geo. D. Wick and John C. Wick of Youngstown, O., with a capital stock of $100,000. The company will operate the hoop, band and cotton tie mill at Pomeroy, heretofore controlled by the Union Iron & Steel Co., Youngstown.

A recent circular of the Bucyrus Steam Shovel & Dredge Co. illustrates dredge No. 1 built by that company for the harbor commissioners of Montreal. In 1894 it made a daily average of 476 cubic yards for 10 hours of shale, hard pan and boulders; this, inclusive of all delays. The best single day's record was 960 cubic yards of unblasted rock. In the season of 1894 a dredge similar to the No. 1, but furnished with a larger dipper, dredged 427,550 cubic yards of clay and sand in 202 days, equal to a daily average for the season of 2,116 cubic yards including all delays.

Empire Boiler Cleaning Co.'s Method.

The immense number of worthless powder compounds now on the market indicate, beyond question, the great need of some thoroughly reliable method of preserving steam boilers from the destructive effects of salts which are found in all feed waters. Most of these compounds are solvents of a caustic nature, which are shortly found out to do more injury than good, as any chemical preparation strong enough to remove scale will corrode the iron itself. In this direction the possibilities of entirely new scientific applications are shown in the method now being successfully introduced by the Empire Boiler Cleaning Co., of 19 Whitehall st., New York. Their idea is to apply interiorly fine particles of metallic mercury, which by the combined action of heat and pressure dislodge all incrustations and form upon the metal surface a thin enamel coating, to which no further scale can adhere and

which thus forms an absolute protection to the tubes and plates. This company has made exhaustive tests of the new process during the past five years, and from the prominence of the engineers and owners whose indorsements it possesses, seems to have effectually solved a difficulty which has in past time cost the manufacturing and motive industries of the world a mint of money. A full explanation of the discovery is given in a pamphlet which is sent free by the company on application. In the past few weeks a number of important orders have been taken among the furnaces, mills and foundries of the Mahoning valley.

G. A. R. AT LOUISVILLE.

One Cent Per Mile Over Pennsylvania Lines for National Encampment.

The rate to Louisville, Ky., for the Twenty-ninth National Encampment of the Grand Army of the Republic will be based upon One Cent per Mile from Ticket Stations on the Pennsylvania Lines. Excursion Tickets will be sold at that rate September 8th, 9th, 10th and 11th, 1895. The Return Limit will cover sufficient time for an extended sojourn, and will be ample for side trips. Southern Railways are expected to make special rates to historic places, and to commercial and industrial centers, enabling visitors to see the South at slight expense. Low rates have already been arranged for the Chickamauga National Military Park dedication, which takes place shortly after the Encampment at Louisville closes. Excursion tickets to Chattanooga for the dedication will be sold over Pennsylvania Lines Sept. 16th to 19th, inclusive.

Special arrangements may be made by Posts desiring to go in a body, or parties of friends wishing to travel together can be satisfactorily accommodated if they will kindly make their wants known to the undersigned. Valuable information will be cheerfully furnished all applicants, and any required aid in shaping details will be promptly extended. It will pay to investigate. C. L. Kimball, Ass't Gen'l Passenger Agent, Cleveland, O.

Widening Use of Gas Engines.

Some of the chief obstacles to the extended introduction of the gas engine have been gradually removed by the improvements in methods and apparatus for the manufacture of producer gas on a small, yet economical, scale. In this, as in other branches of engineering, the law of supply and demand operates to mutual advantage, and isolated gas-engine plants are rapidly coming to the front. On the other hand, for the distribution of power from a central plant to greater or less distances gas offers peculiar advantages. There are practically no losses in distributing the gas in pipe lines, except leakages, which can affect the economy of the distribution. Losses of pressure and temperature changes do not in the least affect the economy of the gas engine at the end of the line. Therefore, the distribution of power by gas, and its utilization by gas engines, scattered over a widely extended area, may come to be a rival of some of the other methods. And the facility of storage and use of gas for heating are additional advantages.

It seemed doubtful for a long time whether gas engines could be made and economically managed in large units; but their present use up to 300 horse power and the contemplated manufacture of gas engines of 500 horse power and upward, leave no room for serious doubting. But it is open to discussion whether there is the same inherent gain in economy in the use of large gas engines as in the use of steam engines. Of course, on the general principles of power production, large units are more economical per horse power than small units. Nevertheless, there is scarcely an argument advanced for the use of large steam engines that can be similarly advanced in the case of gas engines.

In the matter of arrangement of gas engine cylinders there is undoubted preference manifested for the vertical type, and in pairs, with cranks at 180 degrees apart. Four-cylinder or quadruplex gas engines are being seriously considered, to gain an additional advantage along the same lines as the two-cylinder or duplex type, namely, a greater number of explosions per revolution, and, consequently, an increased opportunity to control the supply and explosions according to the load.—[W. S. Aldrich in Cassier's Magazine for September.

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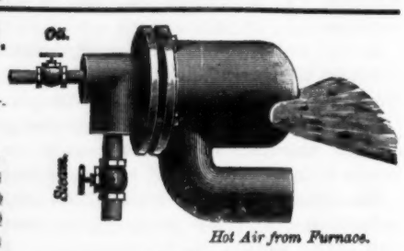

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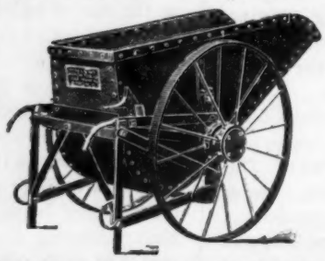

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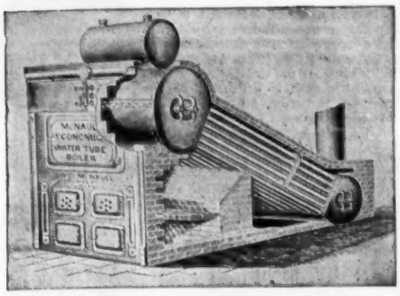

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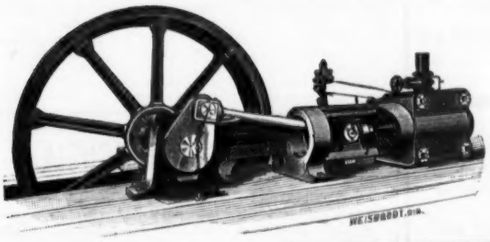

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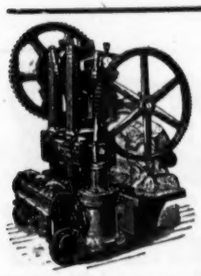

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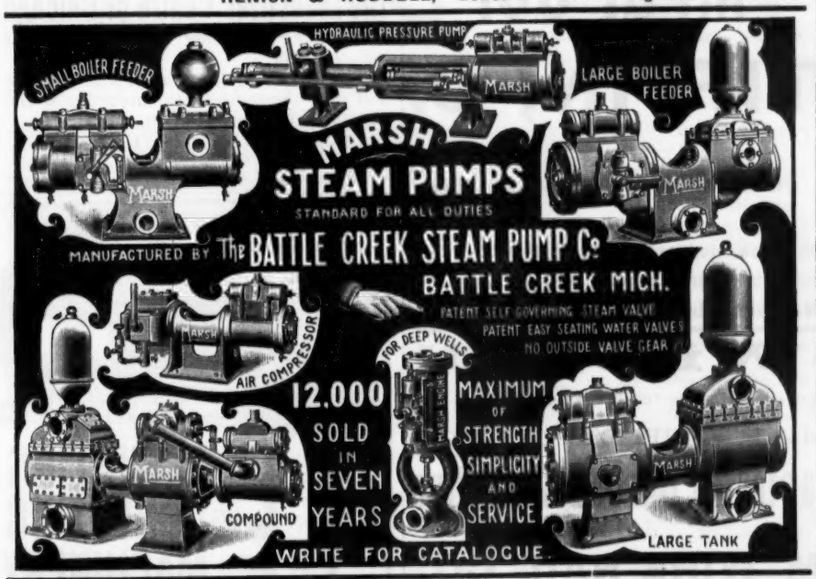

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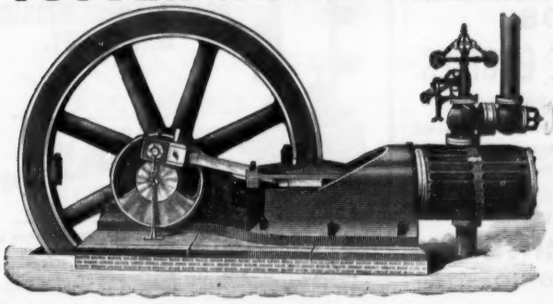

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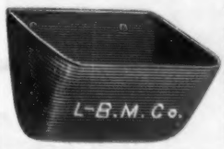

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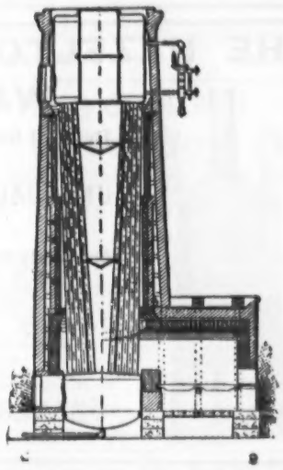

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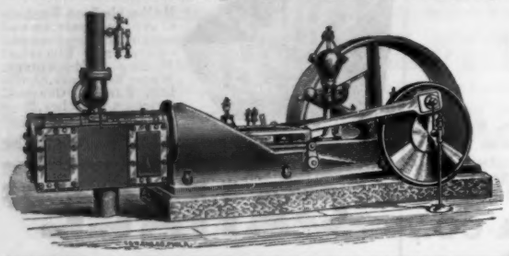

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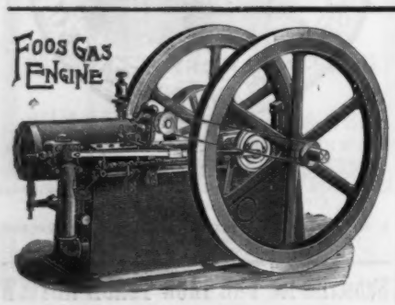

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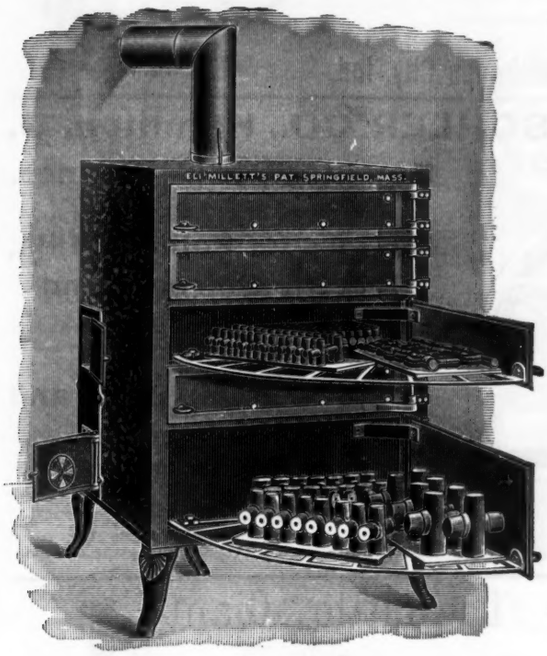

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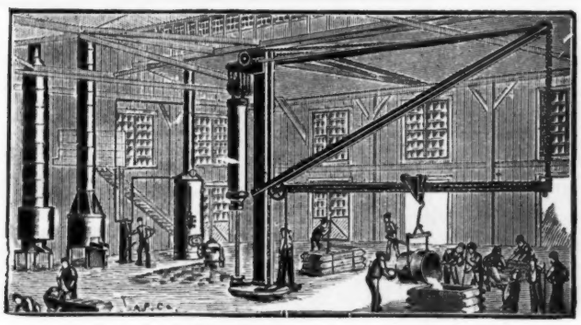
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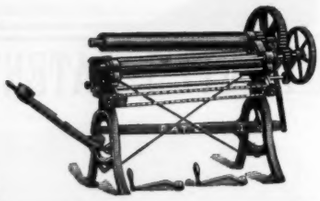

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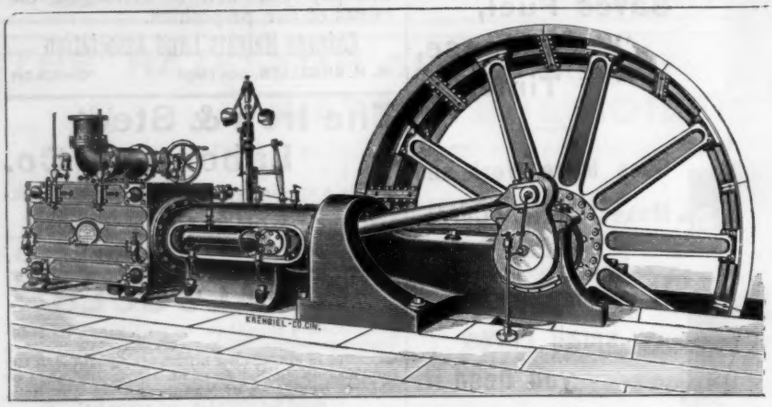

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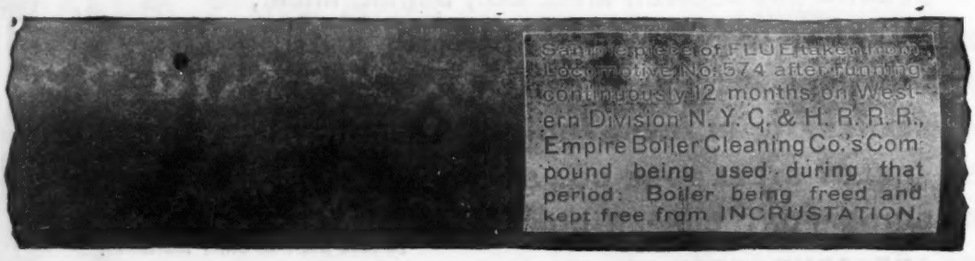
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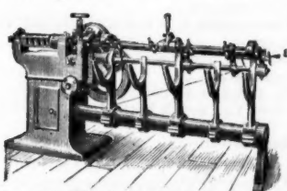

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Link Belt Machine Co., Chicago, Ill.

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Diamond Machine Co., Providence, R. I.

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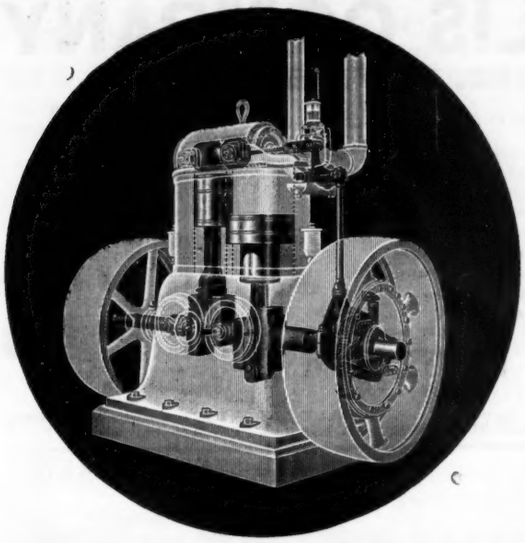

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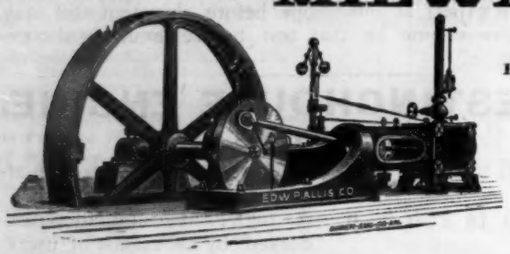

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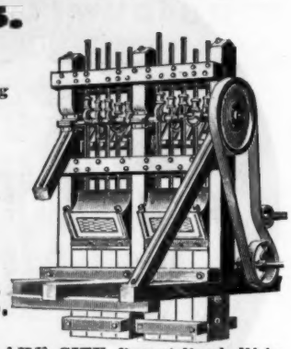

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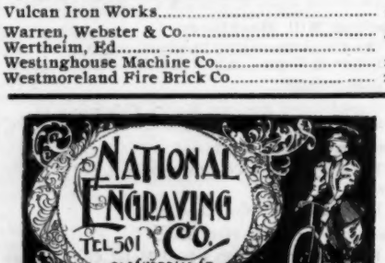

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IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	$3.05@ 3.40
No. 1 Bessemer hematite	2.90@ 3.25
Hematites No. 1 non-Bessemer	2.00@ 2.50
No 1. Specular, non-Bessemer	2.350@ 2.75

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CLEVELAND (f. o. b. cars):

Bessemer	$16 00@ 16 25
No. 1 Strong Foundry	13 75@ 14 00
No. 2 Strong Foundry	12 75@ 13 00
No. 1 Gray Forge, red short	12 40@ 12 65
No. 2 Gray Forge, neutral	11 25@ 11 50
No. 1 American Scotch	14 00@ 14 25
No. 2 American Scotch	13 25@ 13 50
Lake Superior Charcoal	13 50@ 14 00

PITTSBURG:

No. 1 Foundry	$13 50@ 13 75
No. 2 Foundry	12 75@ 13 00
Gray Forge	12 25@ 12 50
White and Mottled	11 50@ 11 75
Warm Blast Charcoal	16 00@ 17 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	16 50@ 16 75

CHICAGO (reported by our representative:)

Lake Superior Charcoal	$14 50@$15 00
Local Coke Foundry No. 1	14 00
Local Coke Foundry No. 2	13 50
Local Coke Foundry No. 3	13 00
Local Scotch Foundry No. 1	13 50@ 14 00
Local Scotch Foundry No. 2	13 00@ 13 50
Local Scotch Foundry No. 3	12 50@ 13 00
Southern Coke No. 1	10 70@ 11 00
Southern Coke No. 2	13 25@ 13 50
Southern Coke No. 3	13 00@ 13 25
Southern No. 1 Soft	13 50@ 13 75
Southern No. 2 Soft	13 25@ 13 50
Southern Silveries No. 1	14 75@ 15 25
Southern Silveries No. 2	14 25@ 14 75
Jackson Co. Silveries	15 50@ 16 00
Ohio Silveries No. 1	15 00@ 15 00
Ohio Silveries No. 2	14 50@ 15 00
Ohio Strong Softeners	15 00@ 15 50
Alabama Car Wheel	17 00@ 17 50
Malleable Bessemer	
Coke Bessemer	

CINCINNATI (reported by Rogers, Brown & Co.)

Southern Coke No. 1, Foundry	$12 50@$
Southern Coke No. 2 and No. 1 Soft	12 25@
Hanging Rock Coke, No 1	12 50@ 13 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	13 50@ 14 50
Jackson County Silvery No 1	14 00@ 15 00
Southern Coke, Gray Forge	12 00
" " Mottled	11 75@ 12 00
Standard Alabama Car Wheel	15 25@ 16 25
Tennessee " "	14 50@ 15 00
Lake Superior " "	15 50@ 16 50

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	Gross Tons
Old iron rails	$17 50
Old steel rails	14 50
	Net Tons
No. 1 R. R. wrought scrap	$14 00
No. 1 wrought scrap	11 00
No. 1 Machine cast scrap	10 00
Iron axles	18 00
Axle turnings	9 50
Wrought turnings (free from cast)	9 00
Cast borings	8 00
Uncut wrought iron boilers	5 00
Steel boiler plates	10 50
Grate bars	7 50
Pipes and flues (clean)	9 00
Tank iron	10 50
Hoop and band iron	7 00
Sheet iron	8 00
Wrought drillings	8 00
Malleable iron	9 00

STRUCTURAL MATERIAL.

Beams and Channels (Cleveland mill)	1.70c@1.75c
Angles	1.60c@1.65c
Tees	1.75c@1.85c
Universal Plates	1.75c
Sheared Plates	1.80c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 25
4¼ to 6 by ⅜ to 1 inch	1 30
1¾ to 6 by 1¼ to 2 inch	1 45
1¾ & 1¾ by ⅜ to ¾ inch	1 30
1 & 1⅛ by ⅜ to ¾ inch	1 35
⅝, ¾, ⅞, by ⅜ to ⅝ inch	1 45

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Geo. H. Bowler, Sec'y and Treas.

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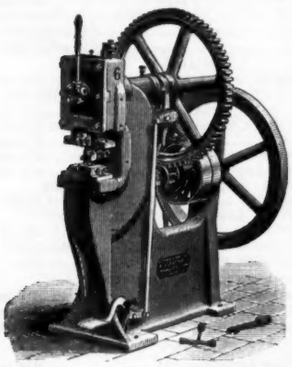
OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.



THE

LONG & ALLSTATTER CO.

HAMILTON, OHIO, U. S. A.

Manufacturers of Belt, Steam and Electrically driven

POWER PUNCHES AND SHEARS,

for all kinds of Boiler, Tank and Structural Iron Work, Rolling Mills, Locomotive Shops, Car and Wagon Shops, Plow Shops, etc.

Send for Catalogue. (3)

A. H. LEITCH, PREST. JOHN C. LEITCH, SEC. AND TREAS.

WESTMORELAND FIRE BRICK CO. MANUFACTURERS OF HIGH GRADE FIRE BRICKS.

PITTSBURG, PA.

Works and Mines, Westmoreland, Pa.

PL DIXON'S PERFECT LUBRICATING GRAPHITE.

The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease.

NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.

An Interesting and Instructive Pamphlet will be sent Free of Charge.

JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

IRON CLAD PAINT CO.

Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g,

CLEVELAND, OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE

Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

Round and Square.

1 to 1⅞ inch	1 25
2 to 2⅛ inch	1 45
2¼ to 3¼ inch	1 40
3⅜ to 4 inch	1 75
4¼ to 4½ inch	2 35
4¾ to 5 inch	2 55

Oval.

⅜ to 1¼ inch	1 45
⅜ to ¾ inch	1 45
½	1 65
⅝	1 85

Half Oval and Half Round.

1¼ to 3 inch	1 80
⅜ to 1½ inch	1 60
⅜ to ¾ inch	1 85
½	2 00
⅝	3 10

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 35
1 to 1⅜ by ¼ and 5-16 inch	1 40
¼ to ⅜ by ¼ and 5-16 inch	1 50
½ to ⅝ by ¼ and 5-16 inch	1 75

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 80
1 7-16 to 2, No. 17, 18 and 19	1 85
1 7-16 to 2, No. 20	1 95
1 7-16 to 2, No. 21	2 05
1 7-16 to 2, No. 22	2 15
1¼ to 1⅜, No. 13, 14 and 15	1 85
1¼ to 1⅜, No. 16, 17 and 18	1 90
1¼ to 1⅜, No 19 and 20	1 95
1¼ to 1⅜, No. 21	2 05
1¼ to 1⅜, No. 22	2 15
15-16 and 1 inch, No. 13, 14 and 15	1 80
15-16 and 1 inch, No. 16, 17 and 18	1 95
15-16 and 1 inch, No. 19 and 20	2 05
15-16 and 1 inch, No. 21	2 15
15-16 and 1 inch, No. 22	2 25
⅞, No. 13, 14 and 15	2 05
⅞, No. 16. 17 and 18	2 15
⅞, No. 19 and 20	2 25
⅞, No. 21	2 35
⅞, No. 22	2 45
13-16, No. 13, 14 and 15	2 15
13-16, No. 16, 17 and 18	2 25
13-16, No. 19 and 20	2 35
13-16. No. 21	2 45
13-16, No. 22	2 55
¾, No. 13, 14 and 15	2 25
¾, No. 16, 17 and 18	2 40
¾, No. 19 and 20	2 50
¾, No. 21	2 60
¾, No. 22	2 70
11-16, No. 13, 14 and 15	2 50
11-16, No. 16, 17 and 18	2 55
11-16, No. 19 and 20	2 65
11-16, No. 21	2 75
11-16, No. 22	2 85
11-16, No. 23	2 95
⅝, No. 13, and 15	2 55
⅝, No. 16, 17 and 18	2 65
⅝, No. 19 and 20	2 75
⅝, No. 21	2 85
⅝, No. 22	2 95
⅝, No. 23	3 05
9-16, No. 13, 14 and 15	2 75
9-16, No. 16, 17 and 18	2 85
9-16, No. and 20	2 95
9-16, No. 21	3 05
9-16, No. 22	3 15
9-16, No. 23	3 25
7-16 and ½ inch, No. 13, 14 and 15	2 95
7-16 and ½ inch, No. 16, 17 and 18	3 05
7-16 and ½ inch, No. 19 and 20	3 15
7-16 and ½ inch, No. 21	3 25
7-16 and ½ inch, No. 22	3 35
7-16 and ½ inch, No. 23	3 45
⅜, No. 13, 14 and 15	3 45
⅜, No. 16, 17 and 18	3 55
⅜, No. 19 and 20	3 65
⅜, No. 21	4 90
⅜, No. 22	4 05
⅜, No. 23	4 20

Light Band.

1⅛ to 6 by 1/16 to 3-16 inch	1 55
1¼ to 6 by Nos. 11 and 12	1 60
1 to 1⅜ by 1/16 to 3-16 inch	1 60
1 to 1⅜ by Nos. 11 and 12	1 65
⅞ and 13-16 by 1/16 to 3-16 inch	1 75
⅞ and 13-16 by Nos. 11 and 12	1 80
¾ and 11-16 by 1/16 to 3-16 inch	1 85
¾ and 11-16 by Nos. 11 and 12	1 90
⅝ and 9-16 by 1/16 to 3-16 inch	2 00
⅝ and 9-16 by Nos. 11 and 12	2 05
½ by 1/16 to 3-16 inch	2 15
½ by Nos. 11 and 12	2 20

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 75
⅞ inch, " " " 13 and 14	1 85
¾ inch, " " " " 11 and 12	1 90
¾ inch, " " " " 13 and 14	1 20

Sheet Iron.

No. 10	1 85
No. 12	1 95
No. 14	2 00
No. 15-17	2 10
No. 18	2 25
No. 20	2 40
No. 22-24	2 50
No. 25-26	2 60
No. 27	2 70

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 80
Shell	1 95
Flange	2 05
Marine Flange	2 40
Fire Box	3 50

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	08
9-16 to ⅞ in. "	08½

—FOR—

JESSOP'S STEEL Tools, Drills, Dies, etc.

Established over a Century ago. Manufactory, SHEFFIELD, ENGLAND.

CHIEF AMERICAN OFFICE, 91 JOHN ST., NEW YORK.

WM. JESSOP & SONS, Limited.

"Medal—World's Columbian Exposition, 1893."

All sizes carried in stock by The W. Bingham Co., Cleveland, Ohio.

HOISTING MACHINERY for Mining, Quarrying, Coal Handling, Pile Driving, Bridge Building, Log Hauling, and for general Contractors' Use. Improved Electric Hoists, single and double Patent Friction Drum, compound, geared with brakes and reversible for general Hoisting, Mining Purposes and Suspension Cable Ways.

Send for illustrated Catalogue giving full description, etc.

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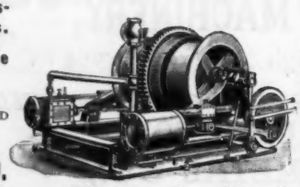

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Salesrooms 143 Liberty st., N. Y. 117-123 PIONEER ST., Newark, N. J.

COMBINE SAFETY WATER TUBE BOILER

Designed on Scientific and Mechanical Lines.

NO CAST IRON—NO STAYED SURFACES—NO DISTORTED TUBES

No large and dangerous diameters in drums.
Inner and outer surfaces of tubes easy of access for cleaning.
Working pressures up to 200 pounds per square inch.
Friction in circulation and flow of steam reduced to minimum.
Dry Steam Guaranteed.

ECONOMICAL IN FUEL—ECONOMICAL IN PRICE—ECONOMICAL IN SPACE

Built in units of 50 H. P. up to 600 H. P.—Standard Sizes in Stock.

L. M. MOYES, (Late Manager Babcock & Wilcox Co.)

PATENTEE AND MANUFACTURER,

Nos. 411-413 WALNUT STREET, PHILADELPHIA, PA.

WHO IS THE "NEXT"?

We have sold our goods to 50 bicycle manufacturers, in the last 30 days, besides supplying our regular trade for Grinding and Polishing Machinery.

"First come is first served," and we would like to serve you "first," but you must send along your order.

We make all varieties of the best Grinding and Polishing Machinery.

Diamond Machine Company,

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THE CENTRAL IRON & STEEL CO.

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MANUFACTURERS OF

Wrought Iron Open Hexagonal Turnbuckles,

MADE FROM THE **BEST CHARCOAL IRON.**

Guaranteed Stronger than any Similar Article on the Market.

All the Pinkertons in the land could not detect a flaw in our....

OUR . . PRICES ARE . . JUST . RIGHT.

"O.K." CROWN

High grade Fire Brick, because they are made from the **BEST** material by **SKILLED** and **EXPERIENCED** Workmen. They are **WARRANTED** to give satisfactory service.

OAK HILL FIRE BRICK AND COAL CO. Manufacturers

.....OAK HILL, OHIO

7-16 to ⅜ and 2⅜ to 3 in.	.09
3⅜ to 4 in.	.09½
⅜ to 11-16 and 4⅛	.10
⅛ to 6 in.	.10½
¼ to 9-32 and 6⅜ to 7 in.	.11
7 to in.	.13

Flats.

	cts. lbs.
2 to 9-16 in. wide by 2 to 5/8 thick	.8

Bessemer and O. H. Steel.

Machinery	base price, 1 60
Tire	" 1 70
Spring	" 2 20
Sleigh Shoe	" 2 10
Toe Calk	" 2 15
Cutter Shoes, tapered and bent	" 2 20

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 30
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 00

Wrought Pipe and Boiler Tubes.

Lap weld black, base	dis. 67
Butt " " "	dis. 57
Lap " galv. "	dis. 55
Butt " " "	dis. 52
Boiler tubes 2¼" and smaller,	dis. 65 and 5
Boiler tubes 2½" and larger	dis. 67½ and 5
Casing screw and socket joint	dis. 52½
Casing inserted joint	dis. 47½

MACHINERY SUPPLY MARKET.

Anvils.

American	₩ lb 9@10
Wright's	₩ lb 12

Bellows.

Blacksmiths' Hill's	dis 40
Blacksmiths' Bullock's	dis 50&10
Moulders'	dis 40@40&10
Hand	dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single,	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 4(
Standard, oak tanned	dis 50&1(
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis35
Horton's Universal	dis40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	₩ 3½
Iron, steel points	₩ lb 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to 46 gr.	No. 54 to 150 gr.	Flour, C. F. FF.
Kegs, ₩ lb	4½c	5 c	2½c
½ kegs ₩ lb	4¾c	5¼c	2¾c
¼ kegs ₩ lb	5 c	5½c	3 c
10 lb cans, 10 in case	6 c	6½c	5 c
10 lb cans less than 10	10 c	10 c	7½c

Emery Cloth and Paper.

Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 60@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 60@70
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 60@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

SHIFFLER BRIDGE COMPANY,

BUILDING DEPARTMENT.

SPECIALTIES: STEEL AND IRON BUILDINGS FOR ROLLING-MILLS, TIN PLATE PLANTS, STEEL WORKS, FOUNDRIES, FACTORIES, ROOF TRUSSES, GIRDERS, COLUMNS, BEAMS, CORRUGATED IRON, ETC.

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228 Lumber Exchange, Minneapolis, Minn.

FOR YOUR OUTING GO TO PICTURESQUE MACKINAC ISLAND.

ONE THOUSAND MILES OF LAKE RIDE AT SMALL EXPENSE.

Visit this Historical Island, which is the grandest summer resort on the Great Lakes. It only costs about $13 from Detroit; $15 from Toledo; $18 from Cleveland, for the round trip, including meals and berths. Avoid the heat and dust by traveling on the D. & C. floating palaces. The attractions of a trip to the Mackinac region are unsurpassed. The island itself is a grand romantic spot, its climate most invigorating. Two new steel passenger steamers have just been built for the upper lake route, costing $300,000 each. They are equipped with every modern convenience, annunciators, bath rooms, etc., illuminated throughout by electricity, and are guaranteed to be the grandest, largest and safest steamers on fresh water. These steamers favorably compare with the great ocean liners in construction and speed. Four trips per week between Toledo, Detroit, Alpena, Mackinac, St. Ignace, Petoskey, Chicago, "Soo," Marquette and Duluth. Daily between Cleveland and Detroit, and Cleveland and Put-in-Bay. The palatial equipment makes traveling on these steamers thoroughly enjoyable. Send for illustrated descriptive pamphlet. Address A. A. SCHANTZ, G. P. A., D. & C., Detroit, Mich.

Cleveland Union Station.

Pennsylvania Lines.

Foot of Bank Street.

TICKET OFFICES at Station, Euclid Av., Woodland Av., and Weddell House corner.

THROUGH TRAINS RUN AS FOLLOWS BY CENTRAL TIME
* Daily. † Daily, except Sunday.

FROM CLEVELAND TO	LEAVE	ARRIVE
Pittsburgh and Bellaire	† 7:00 am	†12:10 pm
Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	†12:45 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 3:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
Philadelphia and New York	*11:10 pm	* 5:25 am
Baltimore and Washington	*11:10 pm	* 5:25 am
Alliance and Pittsburgh	*11:10 pm	* 5:25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:40 am	* 5:15 pm
Akron and Columbus	* 8:40 am	*5:15 pm
Akron, Columbus & Zanesville	†2:45 pm	†12:10 pm
Akron and Orrville	† 3:25 pm	† 9:50 am
Columbus and Cincinnati	* 8:00 pm	* 6:55 am

Valley Ry.

Depot foot of So. Water St.
City Office 137 Superior St.

	Arrive.	Depart.
Akron & Canton	*6:30 P M	*7:10 A M
Akron, Canton & Valley Jctn	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:30 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Chicago	†2:45 P M	†11:00 A M
Wooster		†6:30 P M
Akron, Canton & Marietta	†2:45 P M	†11:00 A M
Steubenv lle, Wheeling, Washington, D. C., and Baltimore	†2:45 P M	†11:00 A M

†Daily except Sunday. *Daily. Pullman's Palace Vestibule Drawing Room cars between Cleveland and Chicago.

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ELECTROTYPE ENGRAVING CO.
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Cleveland - Ohio.

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Pig and Bar Iron,

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LAKE SUPERIOR IRON ORES.

— AGENTS —

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CLEVELAND. PHILADELPHIA.

$2.50 CLEVELAND TO BUFFALO

Via "C. & B. LINE,"

Commencing with opening of navigation (about April 1st). Magnificent side-wheel steel steamers

"State of Ohio" and "State of New York."

DAILY TIME TABLE.

SUNDAY INCLUDED.

Lv. Cleveland,	6:00 P.M.	Lv. Buffalo,	6:30 P.M.
Ar. Buffalo,	7:30 A.M.	Ar. Cleveland,	7:30 A.M.

CENTRAL STANDARD TIME.

Take the "C. & B. Line" steamers and enjoy a refreshing night's rest when enroute to **Buffalo, Niagara Falls, Toronto, New York, Boston, Albany, 1,000 Islands,** or any Eastern or Canadian point.

Cheap Excursions weekly to Niagara Falls.

Send 4 cents postage for tourist pamphlet.

W. F. HERMAN, Gen'l Pass. Agt. **T. F. NEWMAN,** Gen'l Manager.
Cleveland, O.

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offers **Free Factory Sites** and other inducements.

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Chicago Heights Land Association
M. H. KILGALLEN, Gen'l Mgr. CHICAGO

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Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70
Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	12c
" " " " over 5 lbs	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3½	3⅛
Hexagon	15½	11½	8½	6	5½	5¼	
Washers	9	8	7	5	4½	4½	4⅛

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 85
Standard Penny Nails, ₩ keg card rate	
{ Car lots	$2.15
{ Less than car lots	$2.35

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz	dis 10@10&10

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

Pulley Blocks.

Moore's Anti-Friction Differential Chain Pulley Block	dis 20

Rivets.

Iron, Thousand, list November 1, 1894	dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894	dis 60@65
Copper	dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ₩ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " " "	dis 25
Alligator " "	dis 40

CHICAGO HEIGHTS

The Industrial Centre of Chicago

offers **Free Factory Sites** and other inducements.

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Chicago Heights Land Association

M. H. KILGALLEN, Gen'l Mgr. CHICAGO

Brass and Foundry Plants

For Sale or to Rent.

The extensive plant formerly owned and operated by the United Brass Company and the Lorain Manufacturing Company, at Lorain, Ohio.

This plant is located in the city of Lorain, Ohio, a short distance west of Cleveland, where the great Johnson Steel Works, among other manufacturing interests, have been located, and upon one of the best harbors on the lakes. The plant itself is the largest and most complete brass manufacturing plant in the United States and is capable of use as well for manufacturing in iron or steel. The first cost is said to have been in the vicinity of half a million dollars.

The plant consists of a main building of most substantial construction, three stories and attic in height, 385 feet long and 38 feet wide, equipped with the most modern and complete machinery, shafting, engines, etc.

In addition and in connection with this building is a large brass foundry 71 by 143 feet, with core rooms attached, smithy, pattern storehouse, iron foundry 102 by 70 feet, pipe foundry 92 by 98 feet, sand sheds, lumber sheds, sheds for finished stock, carpenter's shop, coal and coke shed, boiler and engine houses, ovens, paint shop, woodworking shop 55 by 93 feet, and all other appurtenances necessary to the equipment of a first-class plant.

The plot upon which this plant is located fronts for about 575 feet on Penfield avenue, the principal thoroughfare in Lorain, and is bounded on the other three sides by Kent, Broad and Forest sts

The facilities for transportation to and from the plant are of the best, shippers having the choice of either the Cleveland, Lorain & Wheeling, or the New York, Chicago & St. Louis ("Nickel Plate") railways, in addition to facilities by water.

The city of Lorain is rapidly improving and increasing in population, and has continued to do so throughout, and notwithstanding, the recent financial depression.

Inspection and correspondence is invited. Either of the undersigned will be pleased to afford further information.

JAMES H. HOYT,
Cleveland, Ohio.
EDWARD WOODMAN,
Portland, Maine.
CHARLES F. MATHEWSON,
45 William St., New York.

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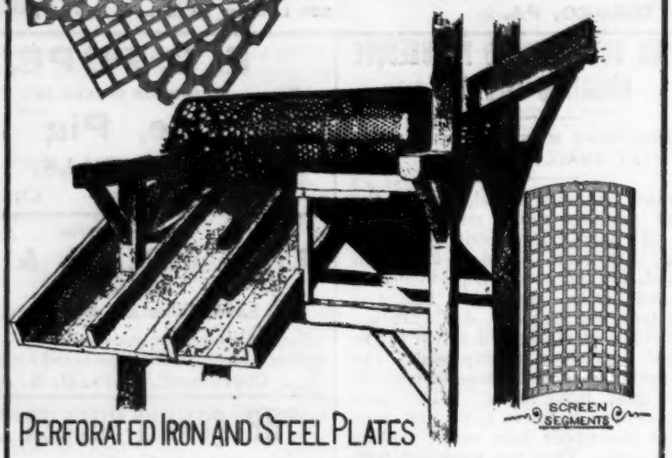

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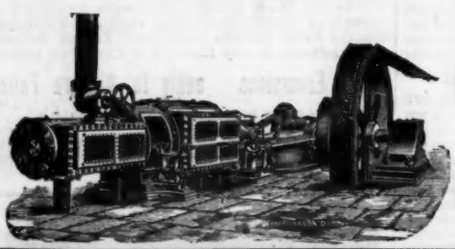

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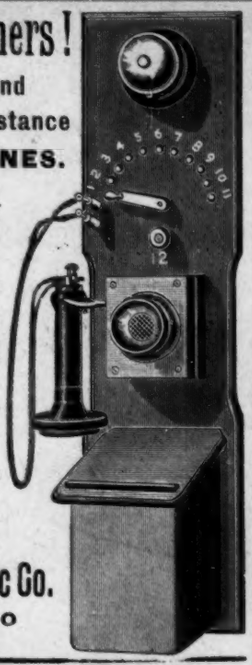

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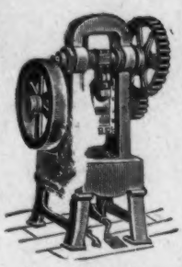

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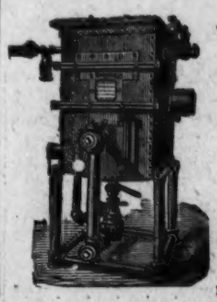

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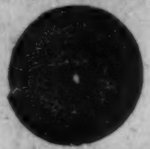

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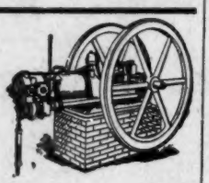

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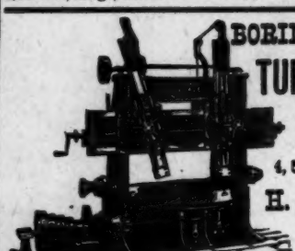

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